

MF HERCC Recommendations Report 2015 Update

*Multifamily Subcommittee of the
California Home Energy Retrofit Coordinating Committee*

FINAL REPORT

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Executive Summary

In 2011, the Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee (MF HERCC) published a report that provided recommendations for the development of consistent standards, procedures and tools for multifamily energy retrofit programs across the state. Since that report was published, ongoing programs and activities have generated new insights and understanding that warrant an update to the original recommendations.

This update report provides recommendations for the refinement of Energy Upgrade California Multifamily programs authorized by the California Public Utilities Commission 2013–14 energy efficiency proceeding. The recommendations are intended for consideration by program administrators and evaluators in the design and implementation of rate-payer incentive programs for the multifamily sector in 2015–16 and beyond. This report also provides a **definition of terms specific to the sector** and insights into multifamily market conditions for low-income housing programs, and for emerging programs such as those funded by Cap and Trade revenue and those that will be defined and implemented by the State’s Assembly Bill 758, which addresses energy efficiency improvements in existing buildings. Building on best practices and lessons learned to date, these recommendations provide guidance for incremental improvements to existing whole-building energy efficiency retrofit programs. Key recommendations are summarized below, with more detailed recommendations provided in the body of the report.

1. STREAMLINE PROGRAM PARTICIPATION PROCESS

- **Customer Engagement:** Programs need to align with property owners’ business practices related to enhancing their assets through property improvements.
 - *Key recommendation:* Prescreen projects before conducting onsite audits to confirm that the timing is appropriate for current enrollment and to minimize the upfront investment by the program and potential participants.
- **Delivery Model:** For delivering program verification services, there are advantages and disadvantages to the rater model and the program partner model.
 - *Key recommendation:* Offer both rater and program partner delivery models in parallel to serve the needs of a greater variety of property types.
- **Program Coordination:** To optimize incentives and savings, owners have to layer participation in multiple programs—a daunting process for even the most determined owners. Affordable properties have the additional layer of low-income program options.
 - *Key recommendation:* Coordinate cap and trade funded programs with other multifamily offerings throughout the state. Encourage these programs to align their requirements with the Tax Credit Allocation Committee (TCAC) sustainable building methods, as other state housing agencies such as California Debt Limit Allocation Committee (CDLAC) have done.
 - *Key recommendation:* Measure efficiency upgrades against a zero net energy (ZNE) baseline in a way that is consistent between programs and TCAC’s regulations.
- **Health and Safety/QA:** Requirements for combustion safety testing requirements are perceived as onerous and discourage participation.

- *Key recommendation:* Revise program requirements to reflect emerging multifamily-specific protocols for diagnostic testing.
- *Key recommendation:* Programs should formalize the collection and tracking of data about the costs to programs for combustion appliance safety testing to enable evaluation of the trade-offs between combustion safety testing and a move towards electrification.

2. REFINE INCENTIVE STRUCTURES

- **Simplicity and Flexibility:** Multifamily property owners want simple incentive structures and the flexibility to choose among measures.
 - *Key recommendation:* Expand eligible energy efficiency measures to include all energy end uses on a multifamily site, including those that are not readily modeled in code compliance software.
- **Energy Modeling:** Full modeling requires significant upfront investment.
 - *Key recommendation:* Use streamlined energy modeling software during pre-screening for initial feedback to property owner about their potential for qualification. Use streamlined energy modeling software for assessing program compliance for flat-rate \$/dwelling unit incentives.

3. INCREASE MARKETING EFFECTIVENESS

- **Green Labeling and Disclosure:** There needs to be more market recognition of the value of voluntary green labels, which can help market-rate properties be more competitive and profitable.
 - *Key recommendations:* Offer incentives for green labeling or disclosure and provide marketing assistance and market recognition for green-labeled properties. Align programs with local or state government mandatory disclosure policies. Incorporate energy benefits of other green building practices. Provide for automated benchmarking services (ABS) to upload aggregated anonymous data at the whole-building level. Evaluate and measure the value of green labeling to all multifamily parties.

4. INCREASE OPERATIONAL ENERGY SAVINGS

- **Property Management Trainings:** Training property managers likely results in some persistence of conservation-based savings.
 - *Key recommendation:* Request information from training participants on the buildings they manage, including the billing address and specifications for equipment that might have potential for commissioning and controls improvements.
- **Monitoring, Commissioning and Retro-commissioning:** Monitoring energy use can enable commissioning and retro-commissioning which improve performance of equipment and systems.
 - *Key recommendation:* Ask training participants if the buildings they manage would be conducive to a sub-metering pilot initiative for master-metered buildings.

5. INCREASE ACCESSIBILITY OF WHOLE-BUILDING ENERGY USE DATA

- **Utility Provision of Aggregated Energy Usage Data:** Many of the EUC Multifamily programs provide technical assistance with benchmarking. In order for this service to be convenient for property owners, the billing data should come from the utility digitally rather than having to manually collect and enter bills.

- *Key recommendation:* Where possible, utilities should provide an administratively efficient process, such as Automated Benchmarking Services (ABS), for building owners to access whole-building aggregated energy usage data.

6. IMPROVE ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

- **Market Demand and Incentives:** Charging infrastructure for plug-in electric vehicles (PEV) is an emerging opportunity for the multifamily sector. But multifamily owners may not yet perceive sufficient demand to make it worth focusing on PEV readiness. And funding/financing for installation and operation, especially for shared infrastructure components, may not be available with terms or costs that are acceptable to property owners or developers.
 - *Key recommendation:* Develop incentives to install electric vehicle service equipment (EVSE) as an integrated demand side management measure, with the assumption that installing chargers at MF properties will facilitate off-peak charging, versus on-peak charging at workplaces, stores and public venues.

7. PROMOTE WATER EFFICIENCY UPGRADES

- Promoting water efficiency upgrades in conjunction with energy efficiency upgrades is particularly compelling in multifamily housing because it is common for multifamily properties to be centrally metered for cold water, and because water heating is a dominant energy use in multifamily buildings.
 - *Key recommendation:* Formalize methodologies to quantify savings of water-energy measures which have been identified as high-impact for the multifamily sector

This report concludes by identifying actions that program administrators and implementers should jointly pursue to address overarching issues that affect all programs or issues that require further investigation. Examples include meter location identification, leased-laundry business market characterization, costs and barriers associated with combustion appliance safety testing, use of MF HERCC's newly updated Combustion Appliance Safety Testing Protocols, energy impacts of water efficiency, energy impacts of building operator training, and preparation for statewide use of the EnergyPro Lite software.

Moving forward, multifamily programs will also need to respond to policy changes and technology developments throughout the state. Some of these new developments will include: annual LIHTC regulation updates, a BPI standards update, ongoing HERS training deliveries, introduction of new program services funded from Cap and Trade auction revenues (such as CSD's multifamily weatherization programs, or the SGC/HCD Affordable Housing Sustainable Communities program), CPUC adoption of new multifamily policies for the Low Income Energy Savings Assistance Program, and an ENERGY STAR Portfolio Manager score for the multifamily sector.

Introduction

In 2011, the Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee (MF HERCC) published a report, “Improving California’s Multifamily Buildings: Opportunities and Recommendations for Green Retrofit & Rehab Programs.”¹ The report summarized the MF HERCC’s recommendations for the development of consistent standards, procedures and tools for multifamily energy retrofit programs across the state.

Since that report was published, experience from multifamily whole-building pilot programs, findings from evaluation studies, and activities of the MF HERCC’s Financing, Software, and Combustion Appliance Safety Audit Protocol Task Groups have generated new insights and understanding that warrant an update to the original recommendations.²

PURPOSE OF THIS REPORT

This report provides recommendations for the refinement of Energy Upgrade California Multifamily programs authorized by the California Public Utilities Commission 2013–14 energy efficiency proceeding. The recommendations are intended for consideration by program administrators and evaluators in the design and implementation of ratepayer incentive programs for the multifamily sector in 2015–16 and beyond. This report also provides insights into multifamily market conditions for low-income housing programs, and for emerging programs such as those funded by Cap and Trade revenue and those that will be defined and implemented by the State’s Assembly Bill 758, which addresses energy efficiency improvements in the state’s existing buildings.

These recommendations are provided as a resource for program administrators and evaluators of ratepayer incentive programs for the multifamily sector.

The recommendations in this report can be implemented as incremental improvements to existing whole-building programs. Building on best practices and lessons learned to date, they suggest new modifications to continue to improve the programs.

Emphasis on Increasing Market-Rate Sector Participation

An important and overarching goal of these recommendations is to increase participation of market-rate property owners in the multifamily energy retrofit programs across the state. The majority of California’s multifamily housing units are market-rate. There has been minimal participation by this sector in Energy Upgrade California Multifamily (EUC MF) programs. Improving the performance of

¹ Available for download at www.multifamilygreen.org/hercc.

² See [Appendix A](#) for information about the evaluation studies and a summary of the MF HERCC Task Groups’ activities.

market-rate multifamily buildings is critical to meeting the state’s climate, energy and water goals. It will also benefit low-income households, the majority of which live in market-rate housing.

The recommendations in this report include program design changes that could increase market-rate participation while maintaining high levels of participation by rent-restricted properties. The recommendations apply both to rent-restricted and market-rate projects unless noted otherwise.

Recommendations

The MF HERCC’s recommendations for improving existing whole-building energy efficiency retrofit programs are discussed in the following seven sections:

- 1. Streamline Program Participation Process**
- 2. Refine Incentive Structures**
- 3. Increase Marketing Effectiveness**
- 4. Increase Operational Energy Savings**
- 5. Increase Accessibility of Whole-Building Energy Use Data**
- 6. Improve Electric Vehicle Charging Infrastructure**
- 7. Promote Water Efficiency Upgrades**

Recommendations that should be given priority consideration are italicized.

1. STREAMLINE PROGRAM PARTICIPATION PROCESS

Market-rate owners typically have little tolerance for complicated program requirements and procedures. Streamlining participation can increase market-rate participation, provide a better customer experience for all participants, and potentially lower program administrative costs.

The recommendations for streamlining program participation fall into these areas:

- Customer Engagement
- Delivery Model
- Program Coordination
- Health and Safety/QA
- Contractor Qualification

Recommendations that should be given priority consideration are italicized.

Customer Engagement

Programs need to align with property owners' business practices around enhancing their assets through property improvements. Even no-cost measures may encounter resistance if too much effort or risk is perceived.

Even no-cost measures may encounter resistance if too much effort or risk is perceived.

Recommendations

- Prescreen projects before conducting onsite audits to confirm that the timing is appropriate for current enrollment and to minimize the upfront investment by the program and potential participants.*
- Simplify the application processes** through all phases of a program to reduce the administrative costs for customers, raters and program administrators; use one standardized online application for all programs to simplify the process for customers to participate across service territories and programs.
- Allow for longer program cycle durations** to accommodate the longer timelines that larger institutions need to make decisions and accrue capital/financing to undertake upgrades.
- Link program offerings to trigger events**, such as substantial rehabilitation, retrofits (e.g., seismic), equipment replacement, unit turnover, recapitalization or acquisition.³
- Seek feedback** from customers, contractors and raters about program experience and adjust accordingly.
- Use appropriate language and shift messaging** to focus on low effort rather than high satisfaction in order to reduce property owners' perception of risk and effort involved. Provide evidence of successful project completion by peers via case studies and peer network messaging.

³ For more discussion on trigger events, see the original [MF HERCC report](#), April 2011: p. 19, fig 7 and accompanying narrative.

- g. **Translate or repackage program offerings into language that lenders and borrowers can understand.** Rather than simply advertising a program’s ROI, repackage the savings benefit message to borrowers to make it clear that they can actually borrow MORE when participating in these programs. This is attractive to both lenders and borrowers.
- h. **Focus “value” messages on co-benefits owners and managers care about** (e.g., improvement to asset, increased tenant satisfaction and potentially lower turnover rates, lower maintenance costs, greater rent security).
- i. Design the participation process so that owners can **take a portfolio approach to benchmarking** and analyzing opportunities in their properties, enabling them to start with their neediest properties and then scale up to address the rest of their portfolio. Use the portfolio approach to build long-term relationships and plan program participation over multiple years. See the section below, [Increase Accessibility of Whole-Building Energy Use Data](#), for additional information on benchmarking.
- j. **Streamline income verification** in the low-income market by using income data verified by other government agencies, if available.

MARKET-RATE MULTIFAMILY SECTOR CONTEXT

These are some of the characteristics of market-rate multifamily ownership that sets it apart from rent-restricted properties.

Who are the owners?

The market-rate sector primarily consists of “institutional” owners—Real Estate Investment Trusts (REITs) and Joint Ventures (JVs), and “independent” owners—corporations or individuals.

How do they make upgrade decisions?

Owners are generally inexperienced in energy upgrades and averse to propositions that are too complicated or unproven.

Independent owners are more likely to make energy upgrade decisions based on capital access, property needs, and simple payback.

Institutional owners typically have access to the capital needed, but have more complex decision making and financial structures:

- They have two interdependent objectives with distinct value propositions: 1) Provide rental housing, operated by asset and property management staff, to **maximize rental revenue**; and 2) serve capital investors, managed by executive staff, to **maintain attractiveness as an investment**. A construction manager often works between these two “sides of the house.”
- Investment decisions are based on ROI and market demand with more focus on increasing revenue than decreasing expenses.
- REITs have access to capital but have complex decision-making processes and need scopes that meet ROI thresholds and can be scaled.
- Energy upgrades face competition from other measures such as cosmetic upgrades and general maintenance.

Delivery Model

Participants in multifamily whole-building programs report that the division of roles between contractors and verifiers is essential. For delivering verification services, there are advantages and disadvantages to the rater model and the program partner model as described below and in Table 1. Depending on the situation, one model may be preferable to the other.

Issues with the Rater Delivery Model: The use of market-based third-party raters as the verification delivery model has presented coordination and communication challenges among the multiple program players and the property owner. However, raters typically work well as program ambassadors where they have a pre-existing relationship with the owners and are working with them for other purposes

(e.g., new construction projects, LIHTC program, or GreenPoint Rated certification). In particular, these prior relationships occur where affordable housing developers seek supplemental energy efficiency funds. Raters also feel there is insufficient business to support them as a rater-only business. Positive perception by raters is important for program success since they are an important outreach channel. Also, a robust and engaged pool of raters is necessary to support long-term market transformation.

There are advantages and disadvantages to the rater model and the program partner model. Depending on the situation, one model may be preferable to the other.

Issues with the Program Partner Delivery Model: An advantage of the turnkey program partner delivery model, which also maintains the separation of roles between contractors and verifiers, is that it reduces the number of entities that owners have to interact with. This model does not offer a rater incentive, but rather provides the services as free consulting directly to the owner via a program partner; this reduces the upfront cost of program participation for property owners, mitigating a barrier to entry. This can be more appealing to market-rate property owners who lack a prior relationship with a rater and are unsure of the program’s benefits. Program partners contracted directly with a utility may also be able to share and analyze tenant/building energy usage data not available in an open rater market under current data access rules. Access to tenant data has substantial rewards to program design and evaluation, including verifying building level bill-savings and benchmarking full energy use across owner portfolios.

Table 1 compares the rater and program partner models from both the participant and program perspective.

Table 1. Comparison of Rater vs. Program Partner Delivery Models

Delivery Model:	Rater	Program Partner
Desirable Trait from Participant Perspective		
Flexible	More flexibility, can hire qualified rater of choice	Less flexibility, one or a few program partners
	Flexibility to choose installation contractor of choice in both program models	
Simple	More complex, requires rater hiring decision which may be unfamiliar to market-rate owner	Simpler, no rater hiring decision required
Streamlined	Initial engagement process is complex More upfront evaluation prior to receiving information about potential program compliance as currently designed	Initial engagement process is streamlined More streamlined evaluation process (less on-site and modeling time, and/or comes later in process once owner has sense of program compliance) in some program designs (varies by program)
Low Upfront Cost	Up-front cost and time investment involved; could be mitigated by incentive structure.	No cost to owner, if included in program model
Desirable Trait from Program Perspective		
Lower Implementation	Rater cost partially (or fully) borne	TA cost directly borne by program, as

Delivery Model:	Rater	Program Partner
Cost	indirectly by program via rebates; cost to train and manage pool of raters may affect program level cost effectiveness	currently designed
Market Development	Creates a market of professionals with capacity to serve other programs and upgrades to assist in market transformation; raters provide project recruitment channel	Does not support market development of open pool of raters; competitive bidding and RFP process develops market of established TA firms
Quality of Data	Issues of inconsistency in modeling practices between raters and programs, varied quality and requires program plan check	Consistent quality and methodology, combines modeling and plan check functions if it is one TA provider; additional actual usage data for utility-contracted program partners
Situational Applicability		
What situations fit better for each model?	TCAC or GreenPoint Rated project, where a rater is being hired anyway (tends to be affordable housing); may require longer construction timelines which may result in higher free-ridership rates	Participants with less experience, aversion to upfront investment, no other drivers to undertake energy upgrades or hire a rater (tends to be market rate), need to evaluate portfolio, may enable shorter construction timelines

Recommendations

- a. **Offer both rater and program partner delivery models in parallel** to serve the needs of a greater variety of property types, and ensure referral and communication between the two delivery model options.
- b. Continue to offer program delivery models that **allow property owners to use existing relationships** with contractors.
- c. Continue to **offer a range of services** to property owners such as portfolio reviews, clipboard audits and full turn-key services to meet the diverse needs of property owners.
- d. **Improve the rater delivery model:**
 - Provide additional support such as marketing and outreach resources and tailored messaging, to encourage raters to make their business models more sustainable by including additional services outside the EUC programs, such as financing.
 - Ensure a sufficient number of projects to support a robust rater pool, and ensure longevity of programs so raters have business continuity.
 - Reduce program implementation costs by creating tools and templates to increase consistency of implementation and submission to reduce rater and program administration time.
 - Reduce program implementation costs by creating online submission portals that align with program requirements.
 - Reduce duplication of participant paperwork by accepting TCAC or other substantial rehab program documentation as substitute for EUC program-specific documents.
- e. **Improve the program partner delivery model:**

- Reduce long-term program implementation costs and enable programs to scale-up by automating and systematizing the services provided; for example, employ project tracking software with multiple user interfaces to minimize off-line communication.
- Leverage program SPOCs to nurture long-term relationships with owners of large portfolios.
- Coordinate with owner-selected raters or consultants to allow them to influence the scope development process if desired by the owner (this will facilitate the participation of owners of large portfolios in multiple program partner programs).

Program Coordination

To optimize incentives and savings, owners would have to layer participation in multiple programs—a daunting process for even the most determined owners. Affordable properties have the additional layer of low-income program options.

Recommendations for all sectors

- a. Coordinate with other programs to **minimize paperwork redundancy**.
- b. **Use cloud-based IT solutions** to streamline applications, data tracking and referrals across programs.
- c. **Expand the “Single Point of Contact” (SPOC)** purview to include all applicable energy efficiency, renewables, water efficiency and financing programs.
- d. **Establish some consistency across programs** offered in different service territories to facilitate participation by portfolios that span territories, and make sure SPOCs can provide referrals across territories.
- e. **Consolidate the number of offerings** to the multifamily sector into a customizable “choose your own path” program option.
- f. Monitor commercial whole-building programs that are based on **realized kWh savings**.
- g. Ensure SPOCs, program partners or raters are able to **guide owners to the utilities’ other programs** as appropriate.
- h. **Help owners create a plan to maximize savings over time** through long-term planning and assistance connecting with the appropriate programs down the line; local governments could be a partner for helping owners create long-term goals (as part of AB 758 implementation or local climate action plans).

Recommendations for the low-income sector

- a. **Coordinate cap and trade funded programs**—including the Community Services Department’s multifamily Weatherization Assistance Program and the Affordable Housing and Sustainable Communities program administered by the Sustainable Growth Council and the Housing and Community Development Department—with other multifamily offerings throughout the state. Encourage these programs to align their requirements with the Tax Credit Allocation Committee (TCAC) sustainable building methods, as other state housing agencies such as California Debt Limit Allocation Committee (CDLAC) have.
- b. **Continue to refine the process for layering** whole-building and ESA program participation.
- c. **Align whole-building program requirements with LIHTC requirements** as they are updated.

- d. **Share information between utilities and government agencies** (e.g., the Department of Housing and Urban Development and the State Treasurer’s Office) more broadly, including information on recapitalization cycles and income to streamline timely administrative procedures and program participation rates.

Recommendations specific to TCAC’s Low Income Housing Tax Credit Program

- a. **Measure efficiency upgrades against a zero net energy (ZNE) baseline** in a way that is consistent between programs and TCAC’s regulations. Demonstrating a percentage improvement over the pre-upgrade conditions for an existing building should remain an option, but to meet the State’s goals for greenhouse gas reductions it will be important to bring as many existing buildings as close as possible to net zero energy.
- b. **Foster regular, effective communication between program managers and TCAC to develop robust, credible ways of accounting for the energy savings of new technologies and systems.** *Due to different schedules for updating program requirements and TCAC requirements, there will be times when it is more efficient to incorporate new measures first in programs, then in TCAC’s regulations; and other times when the reverse order is more efficient. For example, TCAC measures that are not very well supported by energy efficiency program services to date include sub-metering tenants for central domestic hot water credit, and operations and maintenance credits. (See the [Water Efficiency](#) section regarding additional recommendations on sub-metering).*
- c. **Market program offerings to owners of LIHTC projects prior to Year 15.** *Because the financial entities that purchase LIHTCs are only required to remain partners for 15 years, LIHTC projects are typically re-syndicated at that point. This creates a tremendous opportunity for program managers to access a significant base of potential participants. Program managers and marketing teams should regularly monitor which projects received LIHTCs 13 to 14 years earlier, and begin providing technical assistance to the owners shortly before the 15th year.*
- d. **Refine use of the California Utility Allowance Calculator (CUAC)** and promote an understanding of how it can affect financing, owners’ investment calculations, or labeling initiatives.

NEW TCAC LIHTC REQUIREMENTS

Program managers should be aware of the following **TCAC LIHTC requirements** that grew out of the 2011 MF HERCC report:

- TCAC adopted a TCAC-specific set of assessment protocols for evaluating existing conditions in existing buildings. It is based on the HERCC guidelines but focused specifically on the areas of concern for LIHTC projects.
- TCAC adopted a TCAC-specific reporting template for reporting on the findings of an assessment that follows the protocols.
- TCAC encourages applicants to model their buildings using the EnergyPro module developed for use in the multifamily programs.
- TCAC aligned its requirements for professionals involved in several steps in the upgrade process (e.g., building assessments, building modeling, verification of installed efficiency measures, verification of green measures, verification of solar installations, etc.) with the requirements of incentive programs.
- TCAC aligned its competitive point threshold efficiency levels and green measures with those of programs.

TCAC and program managers should make every effort to keep their requirements aligned as they evolve, to minimize the administrative burden on affordable housing developers and owners.

Health and Safety/QA

Requirements for combustion appliance safety testing are perceived as onerous and discourage participation.

Recommendations

- a. *Revise program requirements to **reflect emerging multifamily-specific protocols for diagnostic testing** (see the information about the Audit Protocol Task Group in [Appendix A](#)).*
- b. **Investigate options to promote fuel switching** from natural gas to electric end uses to mitigate combustion appliance safety liability issues and costs. Whether in the tool recommended below or within current tracking databases, *programs should formalize the collection and tracking of data about the costs to programs for combustion appliance safety testing to enable evaluation of the trade-offs between combustion safety testing and a move towards electrification.*
- c. **Set incentive levels to offset the cost of combustion safety testing** and potentially the cost of correcting combustion safety failures (this can vary depending on the nature of the failure).
- d. To the extent possible, **coordinate site visits** (energy assessment, combustion safety testing, verification, QA) to reduce disruption and cost to owners and tenants.
- e. **Develop a tool to track** communications, visits and project progress. This could both streamline the process, and serve to collect data on the actual time and cost spent on combustion safety quality assurance.
- f. Provide clear details on **actions required for various test out results**, and acceptable criteria for waiving otherwise required actions (e.g., old apartments with natural draft wall heaters).

Contractor Qualification

Participants report that being able to choose their own contractors is important. The following recommendations apply to whole-building programs that continue to include detailed contractor requirements.

Recommendations

- a. **Revisit the need for background checks and liability requirements**, which have been a barrier for some installation contractors and property owners.
- b. **Place the liability on the property owner** for hiring licensed contractors.

2. REFINE INCENTIVE STRUCTURES

EUC Multifamily whole-building programs utilize performance-based software and calculate incentive amounts on modeled savings. The Bay Area Multifamily Building Enhancements (BAMBE) program utilizes a flat \$/dwelling unit incentive, which is not calculated based upon savings. Table 2 compares some of the advantages and disadvantages of an escalating or tiered incentive based on energy savings calculations and a flat \$/dwelling unit incentive.

Table 2. Comparison of Tiered/Escalating and Flat Incentive Structures

Incentive Structure:	Tiered/Escalating	Flat
Desirable Trait from Participant Perspective		
Higher Rebate Amounts	Potential to get higher rebates for deeper savings	No potential to get higher rebates
Simplicity	More complex, requires a table and/or calculations to communicate; more questions regarding how energy savings are modeled and more questions about what their final incentive will be	Simple, easy to communicate, remember, and calculate total rebate without hiring professional assistance
Desirable Trait from Program Perspective		
Encouraging Deeper Savings	Encourages adding measures to get higher incentive amount	Some projects still go beyond minimum threshold, but unlikely to be motivated by incentive to significantly increase scope
Budgeting	More complex budgeting as incentives could vary from project to project	Simple budgeting based upon unit projections
Cost effectiveness	Depends on tiers and amounts	Potential to increase cost effectiveness on projects that gain higher than minimum savings thresholds
Savings Claims	Must ensure more accurate savings claims since incremental rebate expenditures are based on energy savings projections	Less sensitive to incremental savings calculations above minimum threshold
Situational Applicability		
What situations fit better for each model?	Major rehabs that are targeting deep savings; projects that have flexibility to increase scope; typically encourages all appropriate scope to be undertaken at once	Projects without other drivers to upgrade; participants that are more risk averse, not fully committed yet and need to know exactly what their rebate will be in order to authorize staff time to pursue program participation; may encourage incremental upgrades and multiple rounds of participation over time, if program is set up long-term

The recommendations in this section fall into two areas:

- *Simplicity and Flexibility*
- *Energy Modeling*

Recommendations that should be given priority consideration are italicized.

Simplicity and Flexibility

MF property owners want simple incentive structures and the flexibility to choose among measures. Program implementers want to incentivize deep energy savings. Incentive structures that require high levels of expertise in using the currently available software to conduct an upfront analysis can be a barrier for owners.

Recommendations

- a. **Expand eligible energy efficiency measures** to include all energy end uses on a multifamily site, including those that are not readily modeled in code compliance software such as those with work paper or standard engineering calculation methodologies.
- b. **Make incentive structures easier to communicate.**
- c. **Maintain higher incentive levels** until participation ramps up.
- d. **Avoid per-project incentive caps.**
- e. **Pay the majority of incentives at project completion** to discourage drop outs.
- f. **Reduce upfront participation costs** by streamlining assessment requirements and processes, or by providing the option to pay assessment incentives directly to raters.
- g. **Offer a flat-rate per dwelling unit incentive** in parallel with tiered/escalating incentives to appeal to participants who prefer a simple incentive structure.
- h. **Offer equal incentives to market-rate and rent-restricted properties** to make program communications easier, to provide equal opportunity, and to encourage market-rate owner participation which is currently lacking in the whole-building programs.

Energy Modeling

Full modeling requires significant upfront investment. Basing escalating or tiered incentives on modeled outputs assumes modeled savings are accurate.

Recommendations

- a. **Use streamlined energy modeling software during pre-screening** for initial feedback to property owner about their potential for qualification.
- b. **Use streamlined energy modeling software for assessing program compliance** for flat-rate \$/dwelling unit incentives.
- c. **Start collecting real-time aggregated energy-use data from participating projects to inform software energy savings predictions.** Note: This is contingent on building owners, or program partners with nondisclosure agreements with the IOUs, having access to their whole-building energy usage data, including some form of tenant data.
- d. **Decouple program qualification reports** to property owners from energy savings claims.

3. INCREASE MARKETING EFFECTIVENESS

Successful marketing strategies for the single-family sector likely won't be effective for the multifamily sector. Marketing strategies must be targeting specifically to multifamily owners and their lenders, and marketing messages must address their business realities.

The recommendations in this section fall into two areas:

- **Green Labeling and Disclosure**
- **Marketing and Outreach**

Recommendations that should be given priority consideration are italicized.

Green Labeling and Disclosure

There needs to be more market recognition of the value of voluntary green labels, which can help market-rate properties be more competitive and profitable. Green labels also gain points for affordable properties in competitive LIHTC funding applications. State and local mandatory disclosure policies on the horizon will be enabled by robust rating mechanisms that require better access to building performance data.

There needs to be more market recognition of the value of voluntary green labels, which can help market-rate properties be more competitive and profitable.

Recommendations

- Offer incentives for green labeling or disclosure (CA Green Business Certification, Energy Star Portfolio Manager benchmarking, GreenPoint Rated, LEED), and keep them consistent with TCAC's LIHTC requirements.*
- Provide marketing assistance to promote green features.*
- Develop market recognition for green labels and energy efficiency.*
- Align programs with local or state government mandatory disclosure policies.*
- Incorporate energy benefits of other green building practices, including electric vehicle infrastructure, water saving measures, and operational savings.*
- Provide for automated benchmarking services (ABS) to upload aggregated anonymous data at the whole-building level.*
- Evaluate and measure the benefit/value of green labeling to all MF parties: owner/operators, potential and existing tenants, and MF property buyer and sellers.*

Marketing and Outreach

Market-rate owners say that one barrier to participation is the lack of examples of peers who have participated in upgrade programs.

Recommendations

- Continue best practices and apply lessons learned** by program implementers (see Marketing Lessons Learned sidebar).

- b. **Develop and share case studies** of successful market-rate participants.
- c. **Modify messaging to speak the language of market-rate property owners** (for example, use the term “consulting” instead of “technical assistance,” and the term “enhancements” instead of “measures”).
- d. **Modify marketing messages to focus on the co-benefits** that they care about, such as lower maintenance costs, increased property value, reduced vacancy, higher rent security from tenants’ lower utility burdens, etc.
- e. **Segment the market into targeted sub-segments** and identify specific drivers and effective messaging, particularly for projects that are likely to utilize financing and that would be influenced by lending language that makes a stronger business/borrowing case.
- f. **Provide materials in multiple languages.**

**MARKETING LESSONS LEARNED
FROM PROGRAM IMPLEMENTERS***

- Make use of local government partners for outreach. Local government staff have relationships with and contacts for owners in their jurisdictions, and both market-rate and non-profit owners have responded to co-branded local government outreach.
- Reach property owners through their established relationships with industry associations.
- Narrow marketing efforts to reach the right multifamily property owners and decision makers rather than casting a wide net to the public. Decision makers vary by property ownership type, from independent owners to asset managers in affordable housing to a complex network of staff and investors in a REIT.
- Plan multiple touches and multiple channels—email, phone, direct mail, etc.
- For deed-restricted affordable housing: Leverage participation in TCAC or other financing and refinancing events.
- Get property owners’ attention and earn their respect by providing compelling, relevant data about building performance, not just program information,

**Effective strategies may vary for market-rate and rent-restricted sectors.*

4. INCREASE OPERATIONAL ENERGY SAVINGS

Property management representatives—including on-site managers, asset managers, facilities maintenance supervisors, independent owners and others—play a critical role in increasing operational energy savings. They make decisions about energy management strategies and they typically influence or are responsible for making energy upgrade decisions. They are also an important channel for informing property owners about energy upgrade incentive opportunities as part of capital improvement projects.

Establishing relationships with property management is an important part of the process of increasing participation in whole-building upgrade programs and other Demand Side Management programming. Training programs can be an effective way to establish and maintain these relationships. The Multifamily Green Property Management Training, for example, has been delivered four times in California, with funding from the California Energy Commission, local governments and utility ratepayers. Developing a rigorous evaluation and measurement plan in conjunction with the roll-out of these Workforce Education and Training programs may lead to documented (and thus, incented) energy savings.

The recommendations in this section fall into three areas:

- **Property Management Trainings**
- **Monitoring, Commissioning and Retro-commissioning**
- **Integrating Operational Savings into Whole-Building Approach**

Recommendations that should be given priority consideration are italicized.

Property Management Trainings

Training property managers likely results in some persistence of conservation-based savings.

Recommendations

- Request information from training participants on the buildings they manage, including the billing address and specifications for equipment that might have potential for commissioning and controls improvements.*
- Offer property management **classroom and/or in-field trainings** that include technical content on energy-efficient building systems operations and other green building topics.
- Offer the **trainings in multiple locations** to increase convenience and reduce costs.
- Provide a **maintenance manual template** and teach its use in the training sessions
- Align property management training and certification** with the O&M requirements of rating systems such as GreenPoint Rated, LEED EBOM and the California Green Business Certification, and with LIHTC scoring criteria (which includes O&M measures).
- Develop research questions** that could be provided to CPUC EM&V should they include a study to quantify impacts of multifamily property management training in the 2016 rolling portfolio proceeding.

- g. **Coordinate Workforce Education and Training efforts** with participation in EUC programs. Train staff on new EE technologies and O&M at time of installation.

Monitoring, Commissioning and Retro-commissioning

To date, programs have not quantified operational savings. Monitoring energy use can inform programs' efforts to encourage operational savings. Commissioning and retro-commissioning can help improve the performance of equipment and systems.

Recommendations

- a. *Ask training participants if the buildings they manage would be conducive to a sub-metering pilot initiative for master-metered buildings.*
- b. As part of property management training, require or otherwise incentivize and provide assistance with **utility automatic benchmarking service set-up** where data is available.
- c. Offer incentives or services for **commissioning of new equipment and retro-commissioning** of existing equipment to improve performance.
- d. Provide resources for **monitoring operational energy end uses** to improve data on potential savings that could be claimed by programs.

Integrating Operational Savings into Whole-Building Approach

Operational opportunities present a significant source of savings within the whole-building approach, and also offer an entryway into long-term energy efficiency planning.

Recommendations

- a. **Integrate training, benchmarking, and retro-commissioning** as components of a long-term whole-building approach, and include opportunities for operational savings in whole-building assessments.
- b. Initiate an effort to attribute and **quantify the impacts of operational savings measures**, establish protocols for verifying ongoing practices, and include operational savings within property owner's long-term whole-building energy savings plans.
- c. Work with asset managers and maintenance staff on **maintenance and repair upgrades**, in addition to working with construction managers on retrofit and rehab upgrades.

5. INCREASE ACCESSIBILITY OF WHOLE-BUILDING ENERGY USE DATA

Multifamily building owners require access to whole-building energy use⁴ information in order to evaluate potential investments and track energy utility bill savings from upgrades in both common areas (typically paid by owner) and dwelling units (often paid by tenant). Program implementers require whole-building energy savings data to better predict savings in future projects, and to utilize tools such as EPA's Portfolio Manager, which is only useful if the data can readily be entered into it.

In certain exceptional cases, and on a very limited basis, building owners have accessed aggregated energy use data for their properties. However, it has tended to be a time-consuming and expensive process, requiring the signing of individual tenant consent forms, sub-metering, and hiring of third-party data monitoring companies. This issue was brought to the fore in an April 17, 2014 Department of Energy Better Buildings Convening in Sacramento on data access. The multifamily sector has been categorically misclassified in various industry definitions which address either single family (e.g., Green Button) or commercial (e.g., AB 1103) data access issues. It is anticipated that the CEC's AB 758 process will explicitly define and address the multifamily sector, and may influence the outcome of current data access efforts in the future.

The CPUC's May 2014 decision on data, D. 14-05-016, provides that utilities can release customer data without consent so long as disclosing the information cannot be linked to a particular customer. It also improves the access that certain agencies (e.g., CSD, UC system researchers, local governments) can have via a prescribed process. But there is not a clear request of the utilities to provide aggregated anonymous data to multifamily property owners who would benefit from the aforementioned Automated Benchmarking services (ABS). There is evidence from the field that current and planned data access solutions are insufficient to provide useful and actionable data. The CPUC has acknowledged that the data needs of building owners was not explicitly addressed in D. 14-05-016 and has shifted the issue to the general energy efficiency proceeding, R. 13-11-005. NRDC, with input from a wide range of multifamily stakeholders, plans to work to ensure this issue is addressed at the earliest possible date at the CPUC (R. 13-11-005) or CEC (under AB 758) as appropriate, in order to make multifamily whole-building aggregate data to available to property owners and program implementers.

In the interim to better usage data availability, programs should include an opt-in provision in the program application for property owners who want to release their program participation data (not necessarily billing data) to be available for use in sharing with Cities for inclusion in Climate Action Plans.

⁴ Whole-building energy use in this context refers to the combination of energy billed via central/property meters and the individual dwelling unit (tenant) meters for gas and electricity.

Utility Provision of Aggregated Energy Usage Data

Many EUC Multifamily programs provide technical assistance with benchmarking.⁵ In order for this service to be convenient for property owners, the billing data should come from the utility digitally rather than having to manually collect and enter bills.

Recommendations

- a. *Where possible, utilities should provide an administratively efficient process (such as Automated Benchmarking Services (ABS) developed for commercial multi-tenant properties per AB 1103) for building owners to **access whole-building aggregated energy usage data**. Ideally, utilities would provide this data in an accessible format and at regular intervals so building owners can continue to evaluate their energy investments over time.*
- b. Programs should promote standardized lease clauses that grant owners the **right to receive unit-level data** from the utility.

Many EUC Multifamily programs provide technical assistance with benchmarking. To make this service convenient for owners, the utility should automate provision of billing data.

Additional Considerations

Use of Billing Data in Program Evaluation: Whole-building data is useful for understanding the building's performance as a whole. It also can protect privacy since the data is aggregated. Modeling analysis would actually benefit from data provided by apartment type (e.g., studio, 1-bedroom, 2-bedroom, etc.), not just by whole building, in order to match the bills at the system level.

Take-Back Factor: It is also important for evaluators to consider what has been termed the “take-back factor” in low-income households, whether in qualified affordable housing or nominally market-rate buildings. In most cases, the actual savings will not be the same as the modeled savings even if the contractor and HERS Rater did their respective jobs perfectly. Most low-income households do not buy all the energy they need to maintain an adequate level of comfort. Once the dwelling unit is made more efficient, tenants may spend just as much as before the upgrades, but they will enjoy a higher level of comfort. Neither programs nor program partners (e.g., contractors) should be punished for this behavioral component which is an aside from the efficiency gains of the upgraded equipment. This “take-back factor” should also be considered when comparing utility bills to modeled predictions of savings, since this behavioral component will influence the efficiency calculations.

Additional Commission or Legislative Action

Because the Commission's default rule is relatively vague and effectively results in few owners receiving aggregated energy usage data, additional guidance will likely be necessary. The default rule enables utilities to release customer data only where one is not able to link information to a particular customer.

⁵ Key tools for Multifamily include EPA portfolio manager (PM) and various vendor systems that integrate with EPA PM such as We Go Wise, Green Compass, Bright Power and Water Smart.

Recommendation

- a. Adoption by the Commission, CEC, or legislature if necessary, of an **aggregated energy usage data standard** specific to multifamily building owners.

6. IMPROVE ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Charging infrastructure for plug-in electric vehicles (PEV) is an emerging opportunity for the multifamily sector. To date, most PEV chargers have been installed at single family homes or commercial sites. To enable multifamily residents to charge an electric vehicle at home, multifamily property owners/managers must provide or allow for some basic infrastructure. This essentially consists of upgrades to the electrical panel, conduit to a designated parking space, and an outlet to which a piece of charging equipment can be affixed. Challenges to the installation of electric vehicle service equipment (EVSE) at some MF properties may include insufficient or inaccessible electric service in parking areas and complicated legal agreements or lack of clarity regarding ownership of parking spaces.

Charging infrastructure for plug-in electric vehicles (PEV) is an emerging opportunity for the multifamily sector.

Providing PEV charging at multifamily properties can offer these advantages:

- Makes PEV ownership possible for more people
- Facilitates off-peak charging (vs. workplace daytime charging), taking advantage of lower time-of-use rates
- Creates potential for one charging station to serve multiple vehicles
- Reduces greenhouse gas and other automobile emissions and air pollution in densely populated areas
- Creates potential for cost recovery for homeowners associations through network charging and other pricing mechanisms

California's ZEV Action Plan

Gov. Brown's Zero Emission Vehicle (ZEV) Action Plan includes these goals:

- By 2015, major metropolitan areas are able to accommodate ZEVs through infrastructure plans and streamlined permitting
- By 2020, statewide ZEV infrastructure is able to support 1 million vehicles
- By 2025, 1.5 million ZEVs are on California roadways

As of January 2015, there are more than 102,000 PEVs on the road in California. They represented 5% of new car sales in 2014. Federal clean vehicle rebate program targets 1 million PEVs on the road nationwide by 2015, which corresponds to approximately 200,000 to 300,000 PEVs in California by the end of the year.

The Role of Local Government

Local governments throughout California have PEV initiatives and policies that align with regional plans adopted by Air Quality Management Districts and the Governor’s ZEV Action Plan. A number of local governments in California are actively taking steps to increase EVSE infrastructure (see the sidebar about efforts underway in Oakland). Local governments are exploring code changes that exceed State building code requirements for EVSE. Local governments can also provide information portals for code, permitting and utility requirements, and can conduct outreach to property managers, developers, HOAs and multifamily residents to explain programs and assess interest.

Market Demand and Incentives

Multifamily owners may not yet perceive sufficient demand to make it worth focusing on PEV readiness. Funding/financing for installation and operation, especially for shared infrastructure components, may not be available with terms or costs that are acceptable to property owners or developers.

Recommendations

- a. **Develop incentives to install EVSE as an integrated demand side management measure, with the assumption that installing chargers at MF properties will facilitate off-peak charging, versus on-peak charging at workplaces, stores and public venues.**
- b. **Inform property owners** about programs and incentives for installing EVSE.

Metering and Billing Configurations

When a PEV charges from the grid at a multifamily property, the load is most likely associated with a master meter or common area meter paid by the property owner. In such cases, the property owner would be paying the transportation fuel costs for their tenant. Methods need to be determined for PEV drivers to pay for use of the charging system.

Recommendations

- a. Encourage MF owners to explore **alternative billing arrangements**. For example, charging equipment companies can charge a subscription rate to the tenant and remit a portion to the property owner. This allows the property owner to recoup the electrical cost, but does not result in the property owner or charging company “selling” kilo-watt-hours.

Oakland Aims to Boost PEV Infrastructure

The City Of Oakland is committed to promoting growth of PEV ownership, including among the city’s residents of mixed-use developments (MUD). After reviewing relevant policy and guidance documents as part of their investigation of ordinance feasibility, City staff has determined that it could be reasonable to introduce a requirement that every new MUD has at least one PEV charger, and to pursue reasonable options to encourage charger installations in existing MUDs. Next steps may include:

- Updating the City’s Green Building code to meet and possibly exceed the new CALGreen Voluntary requirements for PEV infrastructure, which includes a requirement for a charger in any new mixed-use development of 17 units and greater.
- Creating a PEV charging element in zoning regulations for new construction.
- Exploring mechanisms for financing PEV chargers in existing mixed-use developments.
- Developing recognition programs for property owners that install chargers.
- Providing online resources regarding PEV charger installation, including resources specifically for mixed-use development owners and developers.

- b. Encourage the **installation of network chargers with built-in modems** that communicate with a data network. Via an owner’s portal, the HOA or property manager can centrally monitor energy use and set rates for charging. Users can pay with a credit card. This strategy can be used to discourage peak-time charging or encourage off-peak charging; discourage plugging in just to “top off”; and encourage residents to move cars once they are fully charged.
- c. Encourage condominium owners with dedicated parking spaces to **install chargers for their own use**, in coordination with the HOA/property manager. PEV charging companies offer arrangements that allow their customers (the PEV vehicle owner) to lease charging equipment that can be installed (and subsequently removed) on any PEV-ready space.

7. PROMOTE WATER EFFICIENCY UPGRADES

Promoting water efficiency upgrades in conjunction with energy efficiency upgrades is particularly compelling in multifamily housing because:

- It is common for multifamily properties to be centrally metered for cold water, thus the property owner has a direct incentive to install water efficiency measures (in other words, the split incentive is less of a factor).
- Water efficiency can lead to significant water heating savings. Water heating is a dominant energy use in multifamily buildings due to proportionally less energy spent on space heating and cooling per dwelling unit as compared to single family homes. Water conservation also results in upstream energy savings related to water treatment and conveyance.
- Water conservation measures may help improve uptake of energy efficiency programs. The ARRA-funded PAYS on-water bill repayment pilot that coupled energy and water measures saw significant participation from multifamily properties.
- Multifamily property owners may have incentives to market their units as green; improved water efficiency can help the property qualify for a green label.
- Many water utilities use CCF (one hundred cubic feet) as the billable unit for water. One CCF is approximately 750 gallons. In general, a multifamily building with 20 or more units uses enough water to actually see savings of a magnitude to register in the CCF unit. With single family homes, on the other hand, usage is significantly less and only shows up as savings if the gallon unit is used. Water utilities that use CCF billing will be more readily able to use the on-bill mechanism for multifamily housing than for single-family housing since they may not be equipped to demonstrate savings at the granularity of the gallon.

Promoting water efficiency upgrades in conjunction with energy efficiency upgrades is particularly compelling in multifamily housing.

High-Impact Water-Energy Measures

In addition to more traditional measures that are incentivized by the water agencies (such as toilets, faucet aerators and showerheads) specific water-system based measure opportunities are listed below. Note that in-unit clothes washers are not listed as they do not get enough use, as compared to central clothes washers, to be cost-effective from a pay-back perspective. There are barriers to upgrading the efficiency of central coin op laundry due to the predominance of owners using leased, rather than purchased, equipment which is maintained by a vendor.

- **In-unit Measures**
 - Thermostatic “ShowerStart” and “Watermiser” flow control valves
- **Central (Hot) Water System Sub-metering and Monitoring**
- **Domestic Hot Water system improvements**
 - Recirculation controls, pipe insulation, high efficiency pumps
- **Central coin-op clothes washers**
- **Pools**

- High efficiency pumps, pool covers, recirculation pumps on pool water heaters, domestic pre-heat on pool water heater, co-generation systems
- **Landscape**
 - Lawn conversions, weather based irrigation controls, efficient plumbing components, mulch & compost
- **Leak detection and repair**

Recommendation:

- a. **Formalize methodologies to quantify and claim savings of water-energy measures** which have been identified as high-impact savings in either water, energy or both for the multifamily sector.
- b. **Energy efficiency programs should be concurrently offered to the customer as a seamless process with water efficiency measures** such as high efficiency toilets and landscaping irrigation. While these measures do not result in site energy savings, they do have the potential to reduce the upstream energy used to treat and distribute potable water. Onsite water management, rainwater catchment and greywater management have potential but there is a need to work with planning and public health officials to move implementation of these technologies forward.
- c. **Leased-laundry businesses.** Conduct a market characterization study of multifamily leased-laundry businesses. Determine market penetration, saturation of appliance types, baseline efficiency levels, and projected energy and water savings potential in this niche market. Develop a framework for an appropriate and cost-effective market intervention to capitalize on potential energy and water savings in this difficult market.

Pay As You Save Financing

Pay As You Save (PAYS)® is a financing mechanism that allows water utility customers to repay the cost of energy and water conserving upgrades through a surcharge on their water bill. The PAYS model is particularly attractive for multifamily properties. All of the PAYS pilots, including the program originally piloted in California in the Town of Windsor with ARRA funding, and the subsequent 2014–15 BayREN financing sub-program pilot with Hayward Water, EBMUD and SFPUC, primarily target multifamily housing. The PAYS pilot is being coordinated with EUC technical assistance and incentive offerings to the multifamily sector.

Recommendations

The following findings are program design considerations for the on water bill repayment model to work in the market.

- d. **Target master-metered multifamily properties.** The PAYS model requires that the implementing utility have the ability to place a surcharge on the program participant's water bill, which allows the participant to pay for the water and energy efficiency improvements over time. If units in a multifamily property are individually metered, the building is not an ideal candidate for a PAYS program, as placing a surcharge on each metered account would require permission of the individual customer, which would increase transaction costs for the contractor making upgrades at the property.
- e. **Do not pursue individual occupant participation.** In many cases individual occupants are not responsible for payment of the water bill. Also, there can be complicated issues with obtaining property owner consent for upgrades made to individual units.

- f. **Focus on buildings with central water heating systems**, not in-unit water heaters. Central water heater energy efficiency improvements benefit the master-metered water utility customer.

Next Steps

The body of this report includes detailed recommendations for refining statewide energy upgrade programs for multifamily buildings.

Overarching Issues to Be Pursued

The following list summarizes some of the actions program administrators and implementers should jointly pursue to address overarching issues that affect all programs or that require further investigation.

1. **Combustion appliance safety testing protocols.** Program administrators and implementers should use the updated version of the Combustion Safety Testing Protocols for Multifamily Buildings that the MF HERCC released in January 2015. This document is available at www.multifamilygreen.org/hercc.
2. **EnergyPro Lite.** Work across programs for the scale up to statewide use of the EnergyPro Lite software in 2016.
3. **Combustion appliance safety testing costs and barriers.** Document the costs of combustion appliance safety testing and remediation in the multifamily sector and determine the barriers to participation posed by these requirements. Investigate potential fuel-switching opportunities by reviewing advances in electric technologies for multifamily housing and their decreasing costs as cost-effective alternatives to CAS-triggering gas measures.
4. **Energy impacts of water efficiency.** Develop water-energy nexus calculations building upon existing research to determine California's potential water and energy savings from water efficiency measures. Two specific examples include:
 - a. **(Hot) water sub-metering in the existing multifamily sector.** Develop a framework for an appropriate and cost-effective market intervention (such as downstream rebates) to capture energy savings in this untapped area.
 - b. **Leased-laundry businesses.** Conduct a market characterization study of multifamily leased-laundry businesses. Determine market penetration, saturation of appliance types, baseline efficiency levels, and projected energy and water savings potential in this niche market. Develop a framework for an appropriate and cost-effective market intervention to capitalize on potential energy and water savings in this difficult market.
5. **Energy impacts of building operator training.** Catalog multifamily building operator training efforts and document what aspects of these training activities could potentially yield energy savings that can be measured consistently and reliably. Articulate the energy savings theory and hypothesis for a focused list of training activities/outputs/outcomes and recommended approaches to measure indirect energy savings that can be replicated.
6. **Attribution of Savings between incentive and financing programs.** Multifamily program evaluators should develop and employ a methodology for quantification of savings claims that does not penalize programs that have effectively aligned incentives with financing (either low-income or energy efficiency) by discounting their savings as free-ridership or double dipping. It is important for rebates and financing mechanisms to co-exist in order to have a broader impact in the market and for ratepayer funding to effectively stimulate public or private capital investment.
7. **Existing conditions vs. to-code baseline.** Multifamily programs should be able to provide incentives, and claim savings, for equipment that is more efficient than the existing conditions of

the building. The statewide parties should continue to refine the methodology to analyze savings from two baselines—savings estimates from an “existing conditions” baseline and an “above-code” baseline—to better understand the incremental savings achieved, but the programs should not be discounted these savings in determining if they are cost-effective.

8. **Meter location identification.** Develop IOU-specific strategies to determine multifamily meter locations. Initiate a consultant review of IOU customer and advanced metering initiative databases to create actionable processes (turn-key tools) to identify all meters at a given multifamily property address.

Responding to Policy Changes and Technology Developments

Moving forward, multifamily programs will need to respond to policy changes and technology developments throughout the state. Some of these new developments will include: Annual LIHTC regulation updates, a BPI standards update, ongoing HERS training deliveries, introduction of new program services funded from Cap and Trade auction revenues (such as CSD’s multifamily weatherization programs, or the SGC/HCD Affordable Housing Sustainable Communities program), CPUC adoption of new multifamily policies for the Low Income Energy Savings Assistance Program, and an ENERGY STAR Portfolio Manager score for the multifamily sector.

Definitions

HOUSING AFFORDABILITY

Affordable housing—Frequently defined as rent that is less than or equal to 30% of household income. In some situations, affordability may be defined as a percentage of area median income. Affordability is typically maintained over time via rent restrictions or deed restrictions (see below). While many affordable housing units are owned by non-profit entities (see below), there are also for-profit owners.

Low income households—Annual income falls below a given threshold, which differs depending on the context and programs involved. Typical thresholds are expressed as a percentage below area median income or above the federal poverty line. While many low income households live in rent-restricted affordable housing, the majority live in market-rate housing.

Market-rate housing—Rents are determined by the entity operating the building based on what they believe the market can bear. Rents are not externally restricted by a formal mechanism to ensure affordability, although municipalities have a variety of rent control laws. However, in some markets, some market-rate units may be affordable to households with incomes below the area median income. Owners are for-profit entities.

Non-profit housing developers/manager—Entities with federal non-profit status that develop and/or maintain rent-restricted affordable housing units.

Rent-restricted or deed-restricted housing—Rents are restricted to affordable rates by conditions placed on the deed or otherwise imposed on the entity operating the building.

PROGRAM DELIVERY MODELS

Program partner delivery model—A program design that directly contracts with and funds the work of energy auditing and quality assurance firms, called program partners, to conduct pre-installation audits, make energy efficiency recommendations, and conduct post-installation quality assurance. The work done by the program partners is similar to that of the rater in the rater delivery model (see below). In the program partner model, the program selects one or more program partners through a competitive RFP process. The program participant does not enter into a contract with the program partner.

Rater delivery model—A program design that uses third-party professionals, called raters, to conduct pre-installation audits, make energy efficiency recommendations, and conduct post-installation quality assurance. This model utilizes an open pool of qualified raters who are hired directly by the program participant. The program may offer incentives to offset the cost of hiring the rater, but does not directly fund the rater's work.

ENERGY EFFICIENCY & FUNDING PROGRAMS

Affordable Housing and Sustainable Communities Program (AHSC) – A program of California's Strategic Growth Council that funds land-use, housing, transportation, and land preservation projects to support infill and compact development that reduces greenhouse gas emissions.

Community Services Department (CSD) – State department addressing low-income households' self-sufficiency, energy needs, and lead pollution.

Energy Savings Assistance Program (ESA) – A program administered by the IOUs that offers certain in-unit energy efficiency measures in housing units occupied by low-income households.

Housing and Community Development (HCD) – State department that provides leadership, policies and programs to preserve and expand safe and affordable housing opportunities and promote strong communities for all Californians.

Low Income Housing Tax Credits (LIHTC)—A mechanism that allows an investor to take a federal and/or state tax credit when they provide funding to a housing developer for building or maintaining affordable housing units. It is a primary source of funding for rental-restricted affordable housing new construction and rehabilitations. The LIHTC is administered in California by the Tax Credit Allocation Committee (TCAC).

Multifamily Energy Efficiency Rebates (MFEER)—A program administered by the IOUs that offers individual rebates for prescriptive measures or certain equipment meeting the program's specifications.

Sustainable Growth Council (SCG) – A cabinet level committee tasked with coordinating the activities of state agencies on issues such as air and water quality, natural resources, affordable housing, public health, and transportation.

Weatherization Assistance Program (WAP)—A federally funded program administered in California by the state's Community Services Department (CSD) that provides some in-unit energy-related improvements in housing units occupied by low-income households.

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Appendix A. EUC MF Program Status Update & MF HERCC Task Group Activities

This appendix provides an overview of activities that informed the recommendations in this report, including:

- Energy Upgrade California Multifamily program’s mid-cycle meeting in 2014,
- PG&E’s EUC Multifamily Pilot Evaluation study,
- Energy Savings Assistance (ESA) Program’s Multifamily Segment study, and
- Outcomes of the MF HERCC’s three task groups: Financing, Software, and Combustion Appliance Safety Audit Protocol.

Energy Upgrade California Multifamily Program Status Update

Mid-Cycle Meeting of the 2013–2014 Energy Upgrade California Multifamily (EUC MF) Programs

Between 2012 and 2014, the investor-owned utilities (IOUs), regional energy networks (RENs), and a Community Choice Aggregator (CCA) implemented programs or pilots that incorporated recommendations from the 2011 MF HERCC report (see Appendix B for a summary of statewide EUC MF program offerings). At the EUC Multifamily 2013–2014 Mid-Cycle Meeting on March 20, 2014 in San Francisco, the statewide multifamily program implementers summarized lessons learned and best practices in the following categories:

- Delivery Model
- Marketing and Outreach
- Collaboration with Energy Savings Assistance Program (ESA)
- Incentive Structure
- Health and Safety/Quality Assurance

Insights shared at the mid-cycle meeting have been incorporated in the recommendations in this MF HERCC report.

PG&E EUC MF Pilot Evaluation

The PG&E EUC Multifamily Pilot Evaluation completed by Opinion Dynamics provides feedback regarding the EUC Multifamily Whole Building pilot program administered by PG&E and implemented by Build It Green in 2013. The evaluation crystalizes several important program design issues to consider in the scale-up of this EUC whole-building program model, particularly in the areas of:

- Contractor qualifications
- Paperwork and program process
- Single Point of Contact (SPOC)
- Combustion appliance safety testing

In addition, the evaluation report addressed participation by sector, and found that participants were almost entirely non-profit housing projects utilizing Low Income Housing Tax Credit (LIHTC) funding to undertake substantial rehabs. This suggests the need to better engage the for-profit affordable and market-rate multifamily sectors to increase their participation.

The evaluation report also points to the need for the program to be compatible with the California Tax Credit Allocation Committee (TCAC) sustainability regulations for LIHTCs that were updated for implementation in 2014 as well as with other low-income housing funding programs. Greater compatibility will make it easier to leverage affordable housing investments for energy upgrades as part of major rehabilitation projects.

This MF HERCC report includes recommendations that address the detailed program design considerations raised in the PG&E EUC MF Pilot Evaluation.

ESA Program Multifamily Segment Study

The CPUC-ordered Multifamily Segment Study produced findings and recommendations for the multifamily sector, largely within the context of the Energy Savings Assistance (ESA) Program, the rate-payer funded low-income energy efficiency program offered by the IOUs. Finalized in December 2013 and completed by the Cadmus Group, the study focuses on the low-income multifamily building segment, which for this population is defined as 5 or more units. Roughly one third (32%) of California's low-income households live in multifamily housing—with 25% in market-rate multifamily housing and 6% in rent-restricted multifamily housing.⁶

The Multifamily Segment Study includes recommendations particular to the ESA Program, such as:

- Lowering the threshold for treating all units (whether vacant or occupied in buildings where 80% of the tenants are income qualified) and the building shell,
- Using data on recapitalization cycles for marketing programs, and
- Incorporating cost-effective common-area measures and incentives for HVAC replacements.

Additional suggestions in the report include:

- Adopting customized recruitment/marketing strategies (by IOU) to target measures, buildings and geographic areas, and
- Offering options that would integrate the ESA Program with the IOU Multifamily Energy Efficiency Rebate (MFEER) and/or EUC MF to create a comprehensive project path for ESA building owners.

The study also pointed to the need for better coordination and technical support for multifamily building owners and tenants who are eligible for multiple programs. This would help ensure their participation

⁶ ESA Program Multifamily Segment Study Volume 1: Report, Dec 4, 2013: p. 31, fig 4. Accessed Oct 1, 2014: <http://www.energydataweb.com/cpucFiles/pdaDocs/1000/ESA%20MF%20Segment%20Study%20-%20Volume%201%20Final%20Report%2012-04-13.pdf>

results in significant energy savings and other benefits. Strategies for implementing these additional suggestions that are incorporated into the MF HERCC recommendations include collecting and tracking building and other participant data for the purposes of market targeting and cross program coordination, and considering combined forms and streamlined applications processes.

MF HERCC Task Group Outcomes

The MF HERCC's task groups have been active in the areas of financing, energy software development, and combustion appliance safety (CAS) protocol updates:

- **Financing Task Group.** This task group⁷ produced a Multifamily Energy Efficiency Financing Product Comparison Matrix (see Appendix C) comparing key features of seven California-based energy efficiency finance products. The products in the matrix will be specifically available to multifamily property owners in California for energy efficiency upgrades. The matrix does not capture additional low-income housing finance programs with energy criteria, of which there are several in California and nationally (for example, Green Re-finance Plus, TCAC, CSD, HCD and HUD programs, National Housing Trust, Enterprise, CNT, Utility Allowances and others). The products listed are all available to both low-income and market-rate multifamily owners. An exception is the IOU Master-metered MF On-Bill-Repayment (OBR) Pilot, which will target substantially master-metered properties in the affordable housing market segment. The OBR Pilot is scheduled to launch in 2015.

Four of the seven multifamily-specific energy efficiency finance pilots are on-utility-bill based mechanisms, with the Pay As You Save (PAYS) pilot utilizing water bills rather than energy bills (refer to Appendix C). The IOU's On-Bill-Finance (OBF) and the PACE programs are for commercial and multifamily buildings. Overall there is on the horizon a diverse offering of financing products, which is important because no single product will serve all multifamily building owners.

- **Software Task Group.** This task group⁸ provided input to the development of the EnergyPro Lite tool for use by the Bay Area Regional Energy Network (BayREN) Multifamily program. The EnergyPro Lite software is intended to be used as screening mechanism that minimizes initial program participation costs by avoiding unnecessary audits and analyses. The software design assumes the following program conditions:
 - Flat dollar per unit incentive for exceeding minimum performance-based percentage savings threshold
 - Savings calculations performed by one provider or a limited pool of providers rather than by an open market of raters

⁷ The Financing Task Group met via conference call on 11/14/13 with email follow-up to generate the matrix. Participants included representatives from: participation from: California Housing Partnership Corporation (CHPC), U.S. Department for Housing and Development (HUD), MCE Clean Energy, New York State Energy Research and Development Authority (NYSERDA), Pacific Gas and Electric (PG&E), Regional Climate Protection Agency (RCPA), Southern California Gas (SCG), San Diego Gas and Electric (SDG&E), San Francisco Department of the Environment (SFE), and StopWaste. Financing was also discussed at an in-person MF HERCC meeting on 10/23/13 in San Francisco at the CPUC.

⁸ The Energy Software Task Group met via conference call or webinar on 3/14/13, 4/8/13, 5/30/13 and 6/25/13. Participants included representatives from: Association for Energy Affordability (AEA), Build It Green (BIG), Bevilacqua Knight Inc. (BKii), CalCERTS, California Energy Commission (CEC), CHPC, Jeff Hirsch & Associates, Marlin Addison as CPUC consultant, CPUC Energy Division Staff, Energy Soft, PG&E, PSD Consulting, San Mateo County, Santa Clara County, SCE, SCG, San Francisco Environment, StopWaste, and TRC.

- Longer term goal is to true-up analysis to actual bills when data is available, which would enable use of the software for escalating performance-based incentives

The task group reviewed the technical development of the EnergyPro Lite software specs, interface and reports. The task group held webinars that provided an overview of the logic model behind EnergyPro Lite specifications and demonstrations of the tool in various stages of development. Key feedback from the participants that shaped the project deliverables included:

- Decision to use the EnergyPro Nonresidential Performance module calculation engine rather than the Home Energy Rating System (HERS II) engine in order to have the ability to insert custom calculations and be consistent with DOE2
- Decisions on output reports:
 - Property owner report confirming their compliance with program requirements does not include any energy or cost savings claims.
 - Technical assistance provider report includes energy and cost savings analysis that can be presented to customer in combination with other information (e.g., bill analysis, custom calculations) and used for program evaluation.
 - Ability for the technical assistance report to include deemed savings for individual measures where an exact Database of Energy Efficiency Resources (DEER) look-up is available.
- Information on approved deemed savings and work papers used by other programs
- **Audit Protocol Task Group.** This task group⁹ met to update the *MF HERCC Combustion Appliance Safety Protocols*. This updated document was finalized in January 2015 and is available for download at www.multifamilygreen.org/hercc.

The MF HERCC Audit Protocol has been referenced and modified for use by the EUC Multifamily programs in Los Angeles, San Francisco and Alameda Counties, and by SMUD, SoCalREN, SCE/SCG, PG&E, SDG&E and BayREN programs, as well as in the LIHTC/TCAC regulations that produced complementary resources to support use of the protocols on LIHTC projects.

The Combustion Appliance Safety Protocols were considered an ongoing activity—the Task Group has been updating the protocols since they were originally released in 2012 based on program implementer experiences and feedback. The current protocols will be republished with the 2014 updated recommendations for use in 2014–2015 programs. As programs continue to gain experience with and report upon combustion testing in multifamily projects, the protocols

⁹ The Audit Protocol Task Group met via conference call on 3/19/14 and 4/23/14 with follow-up technical reviews. Participants included representatives from: AEA, BIG, BPI, Cal CERTS, CEC, RHA, SFE, StopWaste, and TRC.

will continue to be refined to make them easier to implement while still meeting health and safety goals.

These key changes have occurred since the initial release of the Combustion Appliance Safety Protocols:

- Consistency with Building Performance Institute’s (BPI) Building Analyst (BA), BPI Multifamily BA (MFBA), and National Renewable Energy Laboratory/Department of Energy Multifamily Technical Standards
 - Referenced by TCAC, supplemental use documents developed
 - Revise wording to be consistent with changing BPI BA protocols and other IOU programs
 - Sampling rate for the test-in was modified
 - Stove testing and gas line testing and correction were more defined; anticipate need to revisit
 - Test results documents were modified; anticipate need to revisit
 - Documentation of failures and fixes
- Final review of the updated 2014 CAS protocol will include consideration for making the document(s) consistent with current ESA & EUC Single Family standards and action items.

Appendix B. Summary of EUC MF Programs

This information is current as of the July 18, 2014 meeting of the Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee (MF HERCC).

Program Name	Delivery Model	Assessment Incentive			Upgrade Incentive		Eligibility & Requirements	QA	Goals & Status <i>Popular measures</i>
					% Savings	\$ per Unit			
SDG&E: EUC Multifamily	Rater	N/A (built into upgrade incentive)			10%	\$550	<ul style="list-style-type: none"> • 5+ units • SDG&E gas and/or electric service • No income restrictions • Install 3+ eligible measures • Property owner works with approved Participating Rater 	<ul style="list-style-type: none"> • 100% of projects • Performed by third party 	Goal: 2,800 units Enrolled: 3,119 Reserved: 294 Completed: 108 <i>Water heating, windows, space heating, kitchen appliances, roof insulation, space cooling, lighting, cool roof, floor insulation</i>
					15%	\$625			
					20%	\$800			
					25%	\$1,000			
					30%	\$1,200			
					35%	\$1,350			
					40%	\$1,500			
SCE/SCG: EUC Multifamily	Program Provided Rater/ Consultant	Program pays for assessment and audits			10%	\$700	<ul style="list-style-type: none"> • 3+ units • SCE and SCG service • No income restrictions 	Performed by Rater/ Consultant	Goals: Properties: 20 Units: 1,700 Pipeline: Properties: 10 Units: 1,690 Paid: 0 <i>Too early to determine popular measures</i>
					15%	\$800			
					20%	\$1,000			
					25%	\$1,200			
					30%	\$1,400			
					> 35%	\$1,600			
PG&E: Multifamily EUC Pilot Program (April-Dec. 2013)	Rater	Assessment rebates range based on size of building & whether market rate (MR) or affordable housing (AH)			10%	\$600	<ul style="list-style-type: none"> • 5+ units • PG&E gas and electric service • No income restrictions • Property owner works with enrolled Participating Raters and Contractors for assessment and upgrade 	<ul style="list-style-type: none"> • Performed by Rater • 10% sampling by program staff (BIG) • Rater 100% Test-Out 	2013 Pilot Results Goal: 500 units Assessment Only: 466 Assessment and Upgrade: 513 units Total units - 979 2013–14 Goal= 2,000 units <i>Windows, refrigerator, DHW boiler, low-flow devices, lighting, duct improvements</i>
					15%	\$750			
					20%	\$900			
					25%	\$1,050			
		Units	MR	AH	30%	\$1,200			
		5–30	\$2,500	\$5,000	35%	\$1,350			
31–100+	\$5,000	\$10,000+	> 40%	\$1,500					

Program Name	Delivery Model	Assessment Incentive		Upgrade Incentive		Eligibility & Requirements	QA	Goals & Status <i>Popular measures</i>
		# of Units	\$ per Project	% Savings	\$ per Unit			
SoCalREN: EUC Multifamily Program in Southern California	Rater			10–14.9%	\$200	<ul style="list-style-type: none"> • 5+ units • SCE and SCG service • Install 3+ eligible measures • Property owner works with approved Participating Rater 	<ul style="list-style-type: none"> • Performed by Rater • QC—First project of each Rater; 1-in-7 sampling thereafter by program staff (BIG) 	Goal: 8,000 units Pipeline: 6,772 units Reserved: 2,056 units
				15–19.9%	\$400			
		5–49	\$5,000	20–24.9%	\$700			
		50–100	\$10,000	25–29.9%	\$950			
		100 + (Incremental Increase)	\$20 per unit	➤ 30 %	\$1,200			
BayREN: Bay Area Multifamily Building Enhancements	No-cost Technical Assistance	Full audit not required; program provides no-cost technical assistance and site visit		10% +	\$750	<ul style="list-style-type: none"> • 5+ units • 9-county Bay Area (with exception of Marin, which is referred to MCE) • PG&E gas and/or electric service • No income restrictions • Install multiple measures 	<ul style="list-style-type: none"> • Performed by TA provider 	Goal: 5,000 units Pipeline: 24,000 units Reserved: 6,620 units Paid: 869 units <i>Windows, pipe insulation, roof insulation, low-flow devices, lighting, heating boilers and water heating</i>
MCE: Multifamily Energy Efficiency Program	No-cost Technical Assistance	No-cost walk-through assessment and technical assistance		Customized and based on payback, ranging from direct install in tenant units to comprehensive whole-building incentives		<ul style="list-style-type: none"> • 4+ units • MCE service territory (Marin County, City of Richmond and unincorporated Napa pending 7/15 vote) 	Performed by TA provider	Goal: 1,680 units TA Provided: 2,843 Pipeline: 2,563 units Reserved: 264 units Paid: 790 units <i>Direct install, DHW boiler replacements, pipe insulation, hardwired in-unit and common area lighting</i>

Appendix C. Draft Multifamily Energy Efficiency Financing Product Comparison Matrix

	IOU OBF	IOU MF OBR Pilot	MCE Green MF Loans	PAYS	Bay Area MF CAP	PACE	LA County Commercial PACE
Property Qualifications							
Location	IOUs	IOUs	MCE Territory	PARTICIPATING WATER UTILITIES	9 County Bay Area	PARTICIPATING COUNTIES	PARTICIPATING COUNTIES
Meter - rate	NON-RES***	ALL	ALL - MCE customers (Non MCE Customer option anticipated Q2 2014)	ALL	ALL	ALL	ALL
Meter - config	ALL***	PRIMARILY MASTER	ALL	ALL	ALL	ALL	ALL
Number of Units	N/A***	20+ per building	4+ per building	20+ per building (varies by utility)	5+ (TBD) per building	5+ units	5+ per building
Tax burden	n/a	n/a; NPO owner	n/a	n/a	n/a	MUST PAY PROPERTY TAX & BE CURRENT (NONPROFITS ELIGIBLE)	MUST PAY PROPERTY TAX & BE CURRENT
Occupancy	Borrower reside offsite	At least 50% must be LI qualified based on AMI. Borrower must reside offsite	n/a	n/a	n/a	n/a	n/a
Loan							
Min	5,000 (per meter)	TBD (\$5,000?)	\$10,000	n/a	n/a (TBD)	\$50,000	n/a
Max	100,000 (per meter)	no max	265000 (larger can be considered on a case by case basis)	n/a	500,000	(E) debt+PACE debt cannot exceed property value or "Based on property equity"	n/a
IR	0%	Varies by lender per project	5%	≤7% (varies by utility)	Varies by lender (up to 50% lower than lender IR)	7%-7.5% (varies)	n/a
Term	5	Varies by lender	5 - 10	5 or 10	Varies by lender	5, 10, 15, 20 (per useful life of projects)	n/a
LTV	n/a	Varies by lender	TBD by Lender	n/a	Varies by lender	Up to 20% of property value	n/a
DSCR	n/a	?	TBD by Lender	n/a	Varies by lender	n/a	n/a
Security	not required	Varies by lender	UCC-1 Fixture Filing	No loan, lien, or debt	Varies by lender	Property tax lien	Property tax lien
Repay Mechanism	Energy bill	Energy bill	Energy bill	Water bill surcharge	Lender servicing	Property tax bill line item	Property tax bill line item
LLR	n/a	TBD by CAEATFA/CHEEF	15%	n/a	n/a	n/a	n/a
DSRF	n/a	TBD by CAEATFA/CHEEF	n/a	n/a	n/a	n/a	May be required by lender/investor
Project/Measure							
Audit/Screening Measure Criteria	Savings accrue to non-res meter*** Permanently affixed*** Rebated measure or custom calcs by IOUS staff	Audit paid by Pilot (or CHPC during pre-pilot)	MCE MF EE Program	Surcharge for eligible measures can not exceed 80% (for MF) of total annual utility (water and energy) bill savings; Certification Agent verifies surcharge and	EUC PG&E or Bay Area Multifamily Building Enhancements	ASHRAE L2 or comparable	Audit paid by Owner. May be financed through PACE financing; audit must associate energy savings on a per measure basis
Water	NO	<30%*	<30%*	YES	<30%*	YES	YES
Fundamentals	NO	<30%*	<30%*	NO	<30%*	Case-by-case	NO
Renewables	NO	YES**	Separate on-bill financing product available soon (Q2 2014)	NO	NO	YES	YES

	IOU OBF	IOU MF OBR Pilot	MCE Green MF Loans	PAYS	Bay Area MF CAP	PACE	LA County Commerical PACE
Other Details							
Launch Date	Running	Q1 2014 (pre-pilot) Mid-2015 full pilot	Running	Windsor: Now Available Hayward: Q1 2014 Others: TBD	Q1 2014	Running	Running
End Date				Varies by utility		n/a	Program will continue as long as there is sufficient demand and Financial Institution interest in purchasing bonds.
Program capital / enhancement budget				Windsor: up to \$4m Hayward: up to \$4m	\$1.5M	100% private capital (qualified investors)	n/a
Program capital / enhancement type			LLR	non-revolving line of credit (utility); tariff (participant)	co-financing	n/a	n/a
Expected total loan aggregation			\$3.65 M	Windsor: up to \$4m Hayward: up to \$4m	\$3M	?	n/a

* Total non-EE measure cost must be <30% of total cost financed (combining water, fundamentals - H&S, structural, etc. measures that need to accompany energy efficiency measures)

** Solar Domestic Hot Water Systems (DHW) is a qualified measure. The solar DWH system portion of the loan will not qualify for a ratepayer backed credit enhancement. More details to come with CAEATFA public rulemaking process.

*** May vary by IOU (SCG OBF serves both RES and NON-RES meters of all configurations, without unit count limits, savings can accrue to RES meters, can include non-permanent fixtures)

Appendix D. Summary of Market-Rate Owner Survey

In March 2012 StopWaste commissioned an examination of the financial case for energy upgrades in the market-rate multifamily segment. The project recruited five market-rate owners with large portfolios and interviewed 14 individuals spanning corporate, asset and construction management roles within the organizations, to better understand this segment’s needs and business practices. The statements in this appendix reflect the findings of this process. The examination found that market-rate owner’s decision making differs from that of affordable housing owners on key parameters that influence their approach to energy upgrades.

INTERVIEW PARTICIPANTS

The interviews and observations focused on senior and middle management, corporate as well as on-site property employees, working in their typical settings. This captured input from many key players who might participate in a retrofit financial decision.

Company Type	Participants Interviewed
Real estate investment Trust	<ul style="list-style-type: none"> - Manager, Asset Redevelopment and Construction - Portfolio Maintenance Director - On-site Community Leasing Specialist <p><i>Interview conducted in Fremont, CA</i></p>
Full-service real estate owner, developer	<ul style="list-style-type: none"> - Chief Financial Officer/Chief Operating Officer - Acquisitions Manager - Asset Manager - Head of Construction & Renovation - On-site Property Manager - On-site Building Maintenance Manager <p><i>Interview conducted in Dublin, CA</i></p>
Entrepreneur Owner	<ul style="list-style-type: none"> - Company Owner - On-site Property Manager <p><i>Interview conducted in Oakland</i></p>
Real Estate Investment Trust	<ul style="list-style-type: none"> - Construction Manager, Northern California
Full-service real estate owner and developer	<ul style="list-style-type: none"> - Two Directors of Portfolio Management

INTERVIEW FINDINGS

Market-rate ownership is diverse. The segment primarily consists of “institutional” owners—Real Estate Investment Trust (REITs) and Joint Ventures (JVs), and “independent” owners—corporations or individuals. Independent owners are more likely to make energy upgrade decisions based on capital access, property needs and simple payback. Institutional owners typically have access to the capital needed, but have a more complex decision-making and financial structure.

Institutional owners’ decisions making is time-sensitive, diverse, distributed across many actors within an organization, and dynamic. REITs and JVs **operate two different, interdependent businesses with distinct value propositions. One is to provide rental housing, operated by on-site staff, to maximize rental revenue. This business must operate in rapid adaptation to renter preferences and changing local conditions. The other is to serve capital investors, managed by senior management, to build long-term relationships with investors.** This business must demonstrate responsible and intelligent investment activities that are aimed to maximize profits. Oftentimes there are trade-offs that need to be made between the two sides of the business. The decision making is influenced by many roles and stakeholders. **The construction managers and capital providers are the two stakeholders with the greatest impact on the financial decision.** Construction managers coordinate the bidding and costing of major capital improvements, and serve as a clearinghouse for the company’s historical information and attitude toward investing in capital improvements. Nearly all information through others flow through the construction manager, but this role’s power is limited to influencing. The capital providers have ultimate decision making authority through contractually negotiated approval and veto rights. Other roles that play a prominent role include asset managers, acquisition managers, regional maintenance directors, and regional property managers. The participation of each of these roles is fluid, and may fluctuate depending on the stage of the project and decision making. The decisions must coincide with their typical timeline of budgeting and planning from September through December, bidding for contracts at the beginning of the year, and undertaking construction between the end of the first or second fiscal quarter and the end of the year.

Market rate focuses on revenue, not expenses. The institutional segment has concluded that they can make more profit from increasing revenues than by decreasing expenses. Expenses are estimated to be only 30% of revenues. They prefer to spend their efforts on activities that increase rents and lower vacancies. This implies that energy upgrades must demonstrate their ability to attract tenants and increase rent. This argues for the incorporation of green labels or other mechanisms that make this information transparent in the marketplace. However, the labels or energy efficiency information must have value in the marketplace. The multifamily rental market is hyperlocal and rapidly changing, which means the market value of green or energy efficiency may not be consistently applicable across markets and time. Institutional owners use sophisticated revenue tracking and forecasting tools; these tools do not account for energy use or efficiency.

Market rate evaluates investments based on ROI. Other related metrics include NPV and simple payback. Each company type has its own thresholds for considering an investment to be worthwhile. Typically, thresholds are about 5 year payback and/or 10 to 20% ROI. Institutional owners that answer to

capital investors, or that hold properties for very short periods, may require a quicker payback. In order to quantify these metrics, owners need reliable information about energy savings. Though reduced maintenance costs and increased revenue could be variables to include in these calculations, no quantifiable historic data exists to allow owners to include them.

Market rate is risk averse. Owners rely on positive historical experiences in very particular applications in order to move forward with an investment decision. Where they have not had personal experience, they may look to their competitors in a particular market for positive experiences with a product or practice. Case studies may help build a perception of positive experience. Owners are generally inexperienced with energy efficiency, have no systematic process for undertaking energy efficiency upgrades, and do not know how to get started. Their only evidence to evaluate the success of an upgrade is to look at their utility bills after the fact. They require upfront assistance before committing any resources to an energy upgrade project. They are looking for, and missing, quick, actionable feedback with data points they trust on evaluating a package of measures they might consider on their property. The package content and analysis also needs to be highly flexible. Institutional portfolio owners are highly focused on efficient processes and standardization of measures at properties to save money and time, and gain assured results. They are averse to anything they think is too complicated (inefficient), unproven (risks capital), or can't be replicated (doesn't scale).