

Residential Chapter

Sector Summary

The BayREN Residential Sector Business Plan addresses three core areas: single family residences; multifamily properties; and Green Labeling associated with both single family and multifamily properties. These three subprograms reflect the REN's CPUC directive to address hard-to-reach audiences. Single family and multifamily property sectors are characterized by the challenge to reach property owners, achieve desired energy savings as well as low cost-effectiveness for ALL of the program administrators. However, the residential sector has been targeted by recent legislation and state policy as a priority¹ and shows substantial potential for energy savings with continual increases in energy consumption in the PG&E Planning Area, upwards of 40,000 GWh by 2026².

This business plan for the Residential sector further develops existing programs that BayREN has implemented since 2013, with enhancements to expand reach and capacity, and to improve cost effectiveness and alignment with state legislation and goals.

Market Context For BayREN Residential Sector

The BayREN suite of residential programs focus on a segment of the Bay Area residential market and does not strive to address all of the residential customers needs. As a REN, our directive is to reach hard to serve markets, and to develop programs in areas where the utilities cannot or will not³. To that end, the BayREN residential programs focus on whole building deep retrofits for single family and multifamily buildings. This single family segment of the market tends to be for owner-occupied houses built before 1979, to middle income consumers, with at least a year of college. This roughly represents about 30-40% of single family houses in the bay area, depending on county and mix of characteristics.⁴ The multifamily market is diverse, with 5 to 500 unit properties of most vintages being equally viable candidates for some whole-building work. Properties with central systems (roughly 60% of units⁵) experience the least split incentive and are most likely to participate in a whole building upgrade. Additional market and specific sector details are provided by subprogram areas: Single Family, Multifamily; and Green Labeling beginning on page 8.

¹ See SB350, AB 758, and AB 805

² CEC, "California Energy Demand (CED) Updated Forecast 2015-2025", December 2014.

³ CPUC Decision. 12-11-015, Pg 17.

⁴ MIG, Inc. "Market Research Report - Energy Upgrade California", for Association of Bay Area Governments, Los Angeles county and Alameda County, July 20, 2010.

⁵ Residential Appliance Saturation Survey (RASS), 2010. Statewide value.

Subprogram Summary

Single Family

BayREN's current single family residential programs include the Energy Upgrade California® Home Upgrade Program (HUP) and Home Energy Advisor Program and addresses the needs of multiple stakeholders.

Home Upgrade

The statewide Home Upgrade program includes the two program paths: Advanced Home Upgrade and Home Upgrade. Currently, BayREN implements only the Home Upgrade program and offers a \$300 energy assessment incentive to homeowners who complete an Advanced Home Upgrade retrofit. PG&E is responsible for implementation of the Advanced Home Upgrade program within the BayREN territory.

In Decision 12-05-015, the Commission made a 10-year commitment to Home Upgrade, with a proposed but yet to be established 10-year declining incentive structure beginning in the 2013-2014 program cycle⁶. With this direction, as well as the ongoing success in building industry capacity and reaching customers, BayREN plans to continue HUP and see it through the market transformation process until the expiration of the Commission's 10-year commitment in 2024. Additions to the BayREN Single Family program include the possibility of taking on an expanded role in the implementation of the Advanced Home Upgrade Program as PG&E transitions out of this program.

Moving forward, BayREN has developed a short-, mid-, and long-term plan for Home Upgrade market transformation that begins with robust rebates and contractor recruitment and training and develops into a deeper energy savings program and further supports contractors to become self-sufficient. By the year 2024, at the end of the Commission's commitment to the HUP and with a transformed market, BayREN will either significantly reduce or remove incentives and refocus on Zero Net Energy in existing homes in years 2025-2027.

Home Upgrade Advisor

BayREN originally deployed the Home Upgrade Advisor, a free service to homeowners and contractors for programmatic and technical support, to enhance the uptake of the Home Upgrade program. BayREN will expand the service to become a stand alone non-resource program. BayREN will increase the services offered, including referring customers to low-income and disadvantaged communities programs offered by others, water conservation programs, and other IOU programs. Decision 12-11-015 directed that RENO to focus programs on hard to reach markets including low- to moderate-income residential.⁷ With an expanded Home Upgrade Advisor Program, BayREN seeks to serve that market as well as to create a true one stop resource for Bay Area residential customers regardless of program eligibility. (EBEE Action Plan Goal 2.2, 2.2.5 - Customer Focused Energy Efficiency).

⁶ CPUC, Decision 12-05-015, pg 24.

⁷ CPUC Decision 12-11-015, page 17.

This program has been very successful in educating homeowners on the importance of energy efficiency. Past program data (and research⁸) shows that homeowners working with a Home Upgrade Advisor engaged in deeper retrofits and had higher savings compared to those who did not utilize the service. The Home Upgrade Advisor is a critical part of the Residential Sector business plan and imperative to ensure that contractors and homeowners get needed technical assistance and information during the retrofit process, as well as about the importance of energy efficiency and whole-home upgrades.

Multifamily

BayREN's current multifamily residential programs include the Bay Area Multifamily Building Enhancements (BAMBE) offering no-cost technical assistance and rebates, and Bay Area Multifamily Capital Advance Program (BAMCAP) offering co-financing with private lenders. The BayREN plans to continue our existing Multifamily offerings in the short- to mid-term until they reach a substantial share of the market to demonstrate the viability of energy upgrades. In the mid- to long-term BayREN will add strategies targeting a suite of diverse market drivers that will eventually replace resource-intensive financial incentives. Throughout, the BayREN will focus on fostering long-term relationships with the market. Strategies build upon the EBEE Action Plan for long-term engagement include customer-oriented program design, engage large property owners at the portfolio level, upfront investment planning of multiple upgrade phases to approach ZNE, and addressing operational savings.⁹

Bay Area Multifamily Building Enhancements (BAMBE)

BAMBE provides targeted outreach to multi-family property owners to promote whole building upgrades. Participating property owners receive customized and streamlined no-cost technical assistance and a simple yet flexible per-unit rebate for meeting minimum scope requirements. These interventions are designed to lower barriers to multi-measure upgrades.

Multifamily Financing

The BayREN administers the Bay Area Multifamily Capital Advance (BAMCAP) in conjunction with BAMBE, as authorized by D.13-09-044. BAMCAP offers no-interest co-financing to lenders who underwrite and service traditional loans directly with the property owner. It leverages existing lending practices and infrastructure and serves to lower the effective interest rate to the borrower while replenishing its capital pool. The current offering has successfully enabled BayREN to engage in the multifamily lending industry to facilitate several deals and engage in productive discussion with lenders around EE financing. The BayREN plans to continue to facilitate the use of private capital toward whole-building upgrades and will evolve its role to meet the market's needs.

Green Labeling

BayREN's real estate partnerships and green labeling activities support the State's Existing Buildings Energy Efficiency Action Plan (EBEE AP) Strategy 4.1 to develop methods to increase value of energy

⁸ See LBNL-1004070, Energy Advisors: Improving Customer Experience and Efficiency Program Outcomes (January 2016).

⁹ CEC, "Existing Buildings Energy Efficiency Action Plan", 2015, Strategies, 2.1, 2.2, 2.2.4 and 3.4.

efficiency improvements in real estate transactions. Real estate professionals are in a unique position to help buyers identify energy-efficient properties to purchase and refer them to contractors, rebates and financing for energy-efficiency upgrades. The Joint Center for Housing Studies estimates that home buyers spend more than \$6,000 per year on home improvements in the first two years after purchase¹⁰. BayREN will support state and national initiatives to create greater market transparency and will promote the use of Home Energy Score as a low-cost labeling tool. Home Energy Score serves as an on-ramp to participation in the single-family program. The BayREN Codes & Standards program also supports the use of Home Energy Score in residential energy disclosure policies. Green Labeling strategies were included in the approved Single Family Program Implementation Plan, but in the 10-year Business Plan it is a separate subprogram and will expand to include multifamily buildings.

Evolving Programs and Focus

BayREN plans to evolve its single family and multifamily programs over the next 10 years. This business plan lays out a strategy for increasing energy savings, non-energy benefits related to water and carbon, expanding the building performance contractor base, and working towards transforming both single family and multifamily whole building retrofit markets. To date, the BayREN has trained a new group of contractors, increasing their knowledge and interest in energy efficiency, and helping to expand the market. Contractors and raters are encouraged to expand their knowledge of building performance. Local governments are able to apply energy savings from projects to their climate action goals, and report the progress to elected officials. The BayREN model of member counties implementing energy efficiency programs has allowed local governments to increase their local capacity.

To support market transformation goals, the BayREN proposes to expand its activities in the Residential sector and transition certain existing efforts to new stand alone programs. This includes the Home Upgrade Advisor program, encouraging the adoption of local government policies for multifamily properties, and Green Labeling. These non-resource programs will leverage existing BayREN work with multiple partnerships and strategies to increase energy savings among all Residential sector programs and fill in current gaps that are prevalent in the Residential market and eventually result in a market that does not require incentives and subsidies.

Current and proposed program efforts build on lessons learned from past program cycles, including feedback from EM&V, contractors and internal evaluations. Administratively, the BayREN will focus on improved processes, data management and consistency in reporting to respond to EM&V feedback. (Please see page 32 for additional details regarding EM&V)

An important element relating to EM&V and understanding past and future performance is the need to develop and agree upon an effective method to conduct EM&V for the BayREN programs given its unique mandate and make up. The BayREN, unlike the IOUs, operates a very limited portfolio of programs that by the CPUC's mandate, must be to hard-to-reach markets. This impacts the BayREN in two critical ways:

¹⁰ Joint Center for Housing Studies of Harvard University (2011), "The State of the Nation's Housing: 2011", http://www.jchs.harvard.edu/resarch/state_nations_housing

1. It does not have the breadth of programs to balance more costly and expensive whole building efforts with high saving single measure activities; 2. By definition, the hard-to-reach areas have not been taken on by the IOUs because they are difficult and traditionally have a low TRC, especially in early phases of program ramp-up. The BayREN programs need to be evaluated based on like programs not on portfolio basis. As discussed further in the “Supporting Functions” section on page 32, the BayREN proposes continued coordination with the CPUC to enable the evaluation of REN programs to consider more than energy savings and measures costs and incorporate the difficulty of addressing more challenging markets, progress in market development and non-energy benefits.

Figure 1. Historic Program Performance

	2013	2014	2015
Single Family			
# of Home Upgrade Projects	40	697	1,394
Average Energy Savings	9%	12%	13%
TRC	Verified: N/A	Verified: 0.05	Claimed: 0.27
PAC	Verified: N/A	Verified: 0.06	Claimed: 0.44
Multifamily			
# of Upgraded Units	N/A	8,314	7,512
Average Energy Savings	N/A	16%	16%
TRC	Verified: N/A	Verified: 0.27	Claimed: 0.73
PAC	Verified: N/A	Verified: 0.30	Claimed: 1.40

Vision, Intervention Strategies and Objectives

The table below provides the BayREN’s 10-year vision and the intervention strategies, detailed in the following sections, designed to realize this vision.

10 Year Vision	Strategy	Objective
Single Family		
<i>Market demand for whole house upgrades achieves a high enough volume to discontinue incentives and maintain a robust industry</i>	R1. Improve and streamline program to increase energy savings and reduce program costs.	<i>Increase program value and enable market transformation.</i>
	R2. Provide complementary offerings that drive leads and help to convert those leads to Upgrades.	<i>Reduce upfront barriers to whole house upgrades.</i>
	R3. Increase number of trained whole-house, building performance contractors.	<i>Establish a robust industry to support whole house upgrades into the future.</i>
	R4. Reposition Home Upgrade Advisor as a stand alone program, expanding services to educate and assist contractors and homeowners.	<i>Homeowners and contractors increase participation in the Home Upgrade Program.</i>
	R5. Leverage local government role as a trusted messenger to expand reach and collaborations.	<i>Increase number of projects and innovative approaches to upgrade homes.</i>
Multifamily		
<i>Multifamily property owners adopt energy efficiency upgrades as standard practice</i>	R6. Continue Bay Area Multifamily Building Enhancements (BAMBE) streamlined technical assistance and rebate program model.	<i>Expand program uptake until substantial market share demonstrates viability of whole-building upgrades.</i>
	R7. Focus on building on-going, long-term relationships with property owners through ZNE investment planning and operational savings.	<i>Enable multifamily property owners to optimize trigger points and capital resources effectively.</i>
	R8. Introduce other market drivers, specifically local government policies, green labeling and access to financing.	<i>Adoption of local government policies and presence of other market-based mechanisms that encourage building upgrades.</i>

Green Labeling		
<i>Demonstrate value-added benefit of energy efficiency upgrades at the time of sale</i>	R9. Engage, educate and motivate the Bay Area’s real estate, rental and financing professionals	<i>Real Estate professionals discuss energy efficiency with clients and promote it as a means to increase property values</i>
	R10. Support the use of “green fields” in the Bay Area’s Multiple Listing Services (MLS) and other platforms	<i>Standardize the inclusion of energy efficiency data in property listings</i>
	R11. Test affordable, accessible options for green labeling	<i>Drive demand for energy efficiency upgrades by making efficient and green features more transparent to the market</i>

Through these identified Residential Sector strategies, the BayREN will deliver variety of services and address the conditions that facilitate these upgrade decisions, including readily available technical knowledge and advice, local government policies and green labeling systems that add transparency to the market, and accessible financing options for covering upfront costs.

Ultimately, this effort will result in residential energy efficiency upgrades becoming a norm, where owners do not consider the upgrade costs as an added expense, but see it as a standard cost of home or building ownership. Further, private investment in energy efficiency will significantly outweigh ratepayer incentive dollars, allowing limited ratepayer funds to be leveraged strategically to continue pursuing deeper energy efficiency. High volume of uptake will also bring down equipment, labor, soft costs and transaction costs.

BayREN Residential Sector Metrics - Summary

The following Sector Metric aligns with the BayREN Residential Intervention strategies outlined in the previous pages and indicates anticipated short, mid- and long-term targets for each of the subprograms. A full metrics table is detailed at the end of this chapter.

Market Effect Metrics	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
Single Family					
Number of units upgraded or incentives provided	2015 baseline (0.2% of market)	Program tracking data	Increase to 5% of market	Increase to 7% of market	Increase to 10% of market
Percent of energy savings per project	11% avg energy savings		13% avg energy savings	15% avg energy savings	20% avg energy savings
Multifamily					
Number of units touched by program services or initiatives	2015 baseline (5% of market)	Program tracking data	Increase to 15% of market	Increase to 30% of market	Increase to 50% of market
Green Labeling					
Number of EE upgraded properties in Bay Area Long-term: Increased value for EE existing homes at time-of-sale	2017 level Unimproved home value	Statewide green building registry Empirical study	10% increase in number of properties	20% increase in number of properties	Quantified value for EE existing homes at time of sale

SINGLE FAMILY SUBPROGRAM

The BayREN program is focused on whole house retrofits and does not manage or provide programs for single measures, do it yourself or other similar “widget” single family energy efficiency programs as the IOUs do. The concept of “whole house energy solutions” was adopted by the CPUC in the CAEESP 2008. The objective of this approach is to “reach all existing homes and maximize their energy efficiency potential through the delivery of a comprehensive package of cost-effective, whole-house energy efficiency retrofit measures...with comprehensive audits, installation services and attractive financing.”¹¹ California launched its first whole house program, Energy Upgrade California, during the ARRA phase in 2010. Two years later, the Commission, in Decision 12-05-015, made a 10-year commitment to the program designed to demonstrate to the market and industry the interest in establishing this approach as the standard for single family retrofits. The original program has been modified and relaunched in 2013 by the four IOUs and two RENs, and was renamed Home Upgrade. The program focuses on a series of measures that upgrades building shell and insulation, HVAC systems, and hot water heaters and many other elements. Overall, the program measures tend to address gas savings at a higher rate than electric savings due to the typical configuration and type of systems for heating and water in California homes.

The BayREN proposes evolving the whole house concept to be more in line with a consumer’s point of view and seeing the homeowner through the journey from a whole home upgrade to an eventual zero net energy home. The evolution would allow a single contractor or connected suite of programs to assist a homeowner considering a whole home upgrade and to continue that customer relationship over time to include deeper retrofits, behavior change and eventually Zero Net Energy. This approach would be enabled in large part by the Home Upgrade Advisor and the adoption of a “customer journey” approach rather than a single touch.

Market Characterization

BayREN represents 101 cities and 9 counties within the San Francisco Bay Area and 20% of the California’s total population. There are over 1.5 million homes eligible for BayREN’s Single Family program (See Figure 1). 2.7 million housing units are occupied with over 1.4 million units owner-occupied.¹² BayREN territory includes portions of 4 different climate zones: 2,3,4 and 12. Climate Zone 12 is the warmest climate zone and also reflects the highest project uptake. (See Figure 4)

Program uptake has grown exponentially more than doubling each year since program launch. From 2013-2015, the BayREN Home Upgrade program paid out just over \$6 million dollars in incentives. 2016 has shown a steep increase (See Figure 3), and is on track to pay an additional \$6 million in 2016 alone. Despite the rapid uptake and over 3,000 completed projects, there is still ample building stock in need of

¹¹ CPUC, “California Long-Term Energy Efficiency Strategic Plan (CAEESP)”, 2008, page 18.

¹² American Community Survey, 2010-2014. Data for all housing unit types.

upgrades within the BayREN territory as only 1% of the market has been reached. Figure 2 below highlights this opportunity.

Figure 2: Bay Area Housing Stock

	Home Upgrade	Advanced Home Upgrade	Total Target
Housing Type Eligibility	Single Family Detached only	Single Family Attached & 2-4 units	1-4 unit homes Attached & Detached
Existing Housing units	1,518,691 (detached)	540,119 (attached and 2-4 units)	2,058,810
Units upgraded*	3,138	1,713	4,851
% Uptake	0.2%	0.3%	0.2 %

Figure 3: BayREN Home Upgrade Projects, Cumulative

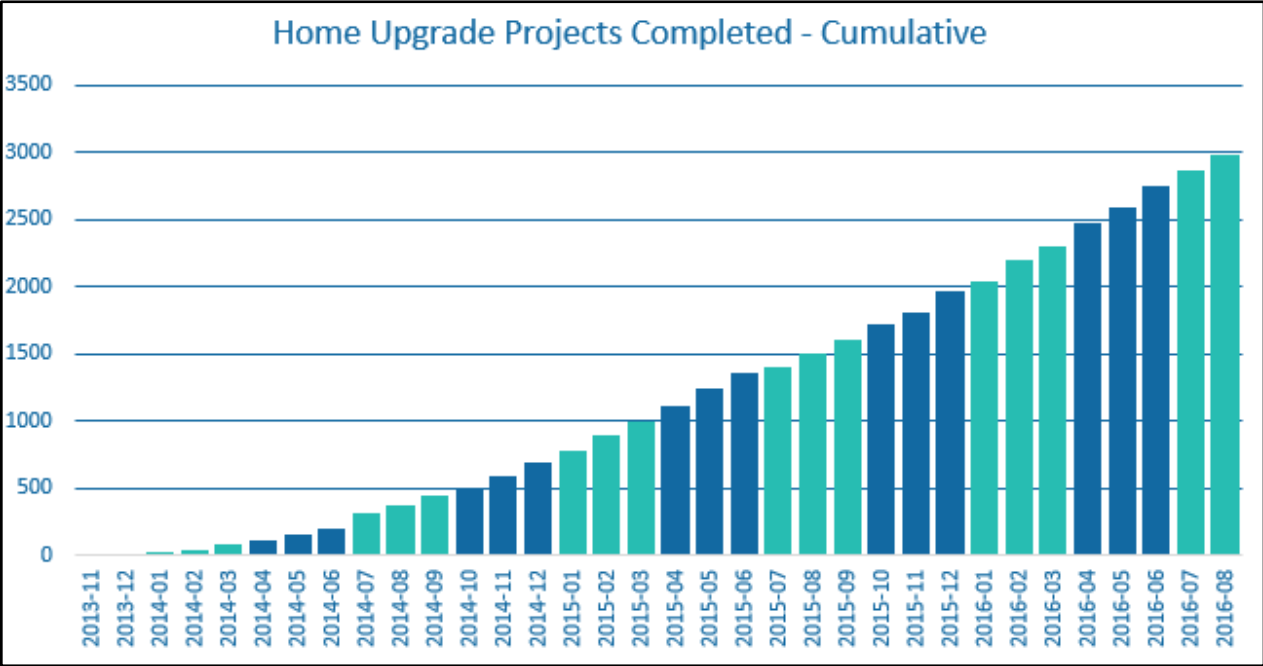
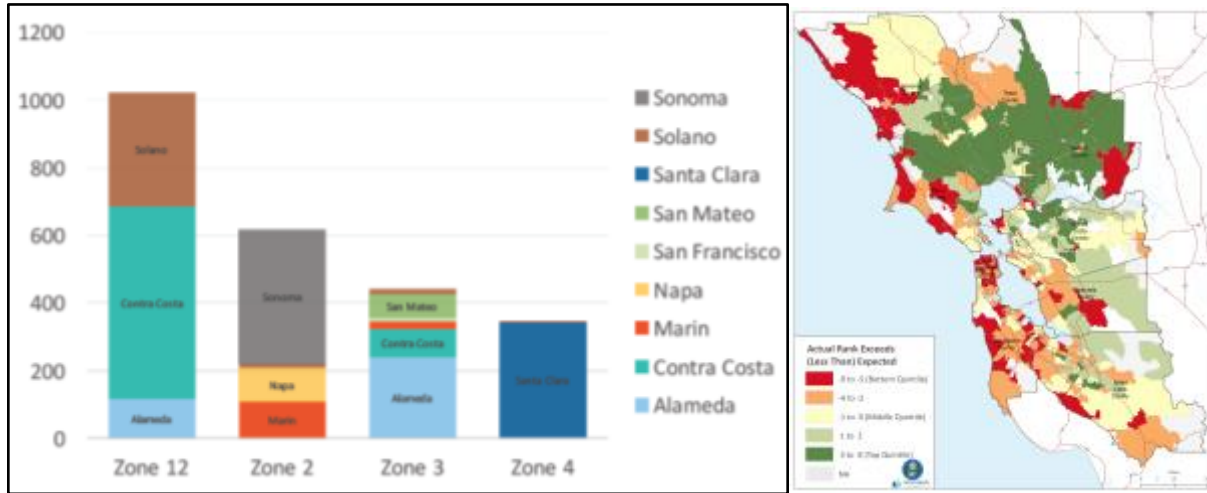


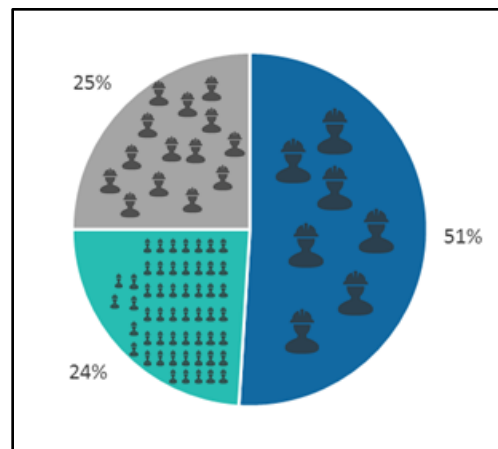
Figure 4: Project Uptake by Climate Zone



Contractor Market

Contractors are a critical component of the whole house programs. In the nine Bay Area Counties, there are substantial opportunities to expand the active contractor base in home performance with both specialty contractors and general contractors. The following numbers of contractors are licensed within the 9 BayREN Counties¹³:

- 23,572 General Contractors (B License)
- 1,617 HVAC Contractors (C-20 License)
- 161 Insulation Contractors (C-2 License)



Currently, the BayREN has 125 Participating contractors with just 7 contractors responsible for 51% of all completed projects. (See graphic) One strategy will focus on supporting less active contractors to increase their volume of whole home jobs.

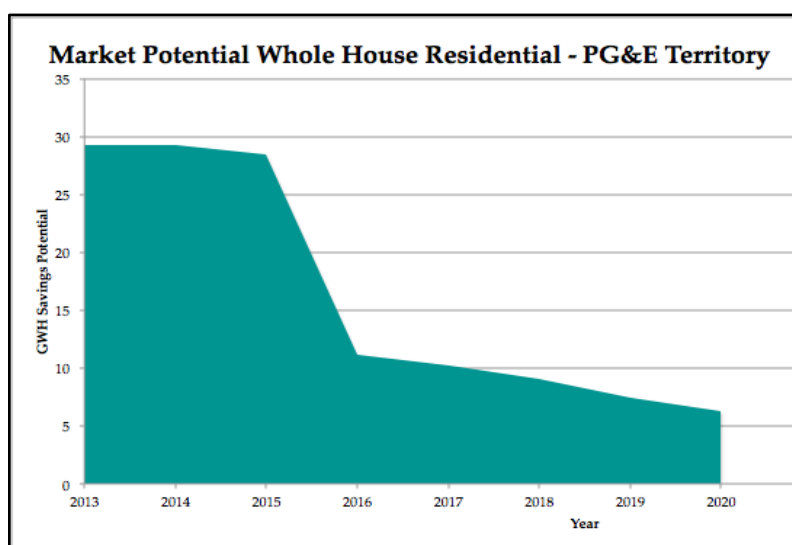
Potential Energy Savings

With over 3,000 projects paid out, the focus will shift from increased uptake to increased energy savings. Past project data shows that higher savings is realized in older vintages of homes (68% of current projects are for houses built before 1979) as well as in the hotter climate zones. BayREN takes into consideration the varied 4 climate zones (SB 350 Section 8.c.3) to provide better customized energy efficiency decisions. BayREN will make program improvements informed by past program data analysis to ensure higher savings and climate goals are met. This approach aligns with the second framework goal of the EBEE Action Plan to provide data-driven decision making that enhances program design while providing consumer-focused energy efficiency.

¹³ Contractors State License Board, May 2014.

Statewide, the residential sector accounts for 32% of the total state electricity consumption and 36% of natural gas consumption. Of that, single family homes account for two thirds of the usage¹⁴. AB 350 goals of linking incentives directly to both measured savings and customer understanding can be realized through Home Upgrade. Navigant’s 2015 Potential and Goals Study, unlike the 2013 report that saw only negligible savings based on preliminary results¹⁵, indicates savings opportunities for energy savings for whole house retrofits in the PG&E territory up to 2021 (See Figure 5). The Bay Area’s temperate climate may provide somewhat less savings when considering only shell and building systems, but focusing on the hotter areas within BayREN territory is an opportunity, as is expanding what is included in a “whole house” approach to incorporate behavior, plug loads and appliances.

Figure 5: Potential Energy Savings



Navigant 2015 Potential and Goals Study

A significant finding in the Navigant 2013 study is the importance of non-energy benefits from the whole building market, “Non-energy benefits are highly valued by EUC participants; however, no policy framework exists to monetize these non-energy benefits for the purposes of cost-effectiveness screening or potential study modeling.”¹⁶ The Home Upgrade Advisor (“HUA”) has been a successful element of the current program, and addresses some of these barriers and will be an important mechanism to garner more energy savings and non-energy benefits. As of August 2016, the HUA has assisted 1110 homeowners with a 69% conversion rate and has referred over 4,000 homeowners to 100 different complementary programs. Significantly, homeowners that worked with the HUA had a 24% increased overall energy savings from those that did not use the Advisor.

¹⁴ CPUC, “CAEESP”, 2011.

¹⁵ Navigant, “2013 Potential and Goals Study”, page 143.

¹⁶ Ibid., page 144.

Single Family Intervention Strategies

The rapid uptake of the program shows no indication of slowing down. With an abundance of housing stock, the limited market penetration of whole house retrofits, and the current program and project costs, the program could continue to provide incentives for a number of years to create a normalized state where incentives are no longer necessary. The vision is to transform the market to be self-sustaining and produce deeper upgrades by addressing and overcoming challenging market barriers.

There are multiple market barriers that prevents participation and it is a costly program to operate, both issues threatening market transformation. However, in order to meet the state’s goal for residential energy efficiency, it is imperative that a whole home program is available. Residential programs inherently have low cost effectiveness numbers and require significant startup funding before they can break through the hard-to-reach market and demonstrate transformation of the market and deeper energy savings.

The BayREN Residential Sector Business Plan focuses on transition from the current “start-up” program phase of the first three years to a stronger energy savings program that is affordable, of high value to customers and policy makers, and is supported by a robust industry. To that end, the BayREN will implement an expanded set of support mechanisms, maintaining the core Home Upgrade program, but expanding and layering on services to extract more savings, create a better customer experience and establish long term relationships allowing for the expansion of savings through behavior change and deeper retrofits. In addition to contractor development, BayREN will continue to make improvements to the program design that will increase savings, streamline administration and implementation and gradually move the program towards market transformation. By year 8 of implementation, BayREN plans to deeply reduce incentives and refocus efforts on moving existing homes to zero net energy. The objective is to create a market where the demand for whole home upgrades reaches a volume that incentives are no longer required.

The BayREN offers the following strategies to address problem statement and market barriers, and that align with the overall BayREN portfolio goals.

Problem	Market Barrier	Strategy
Single family homeowners do not understand the need or value of a whole home upgrade	Homeowners are not educated on the benefits of whole home upgrades	Home Upgrade Advisor to educate homeowners on the value of whole home upgrades <i>Strategy R1, R2, R3, R5</i>
	The value and timing of a whole home upgrade is not aligned to the homeowner’s needs and interests	Home Upgrade Advisor to introduce program add-ons such as Financing products, Home Energy Score and smart home products, to improve uptake <i>Strategy R2</i>

	The limited scale and uptake of whole house programs are not cost effective for implementers, contractors or homeowners	Make program improvements that allow for scaling the program to increase energy savings and reduce reliance on incentives <i>Strategy R1, R3, R4</i>
There are not sufficient numbers of whole-house, building performance contractors to market, support and complete the work	Contractors are not educated on the benefits of whole home upgrades as a business model	Home Upgrade Advisor to assist and educate contractors on the value of and commitment to whole home market <i>Strategy R1, R3, R5</i>
	Slow engagement among specialty contractors	Assist Specialty contractors to expand their services to full building performance and/or partner with other firms to achieve a better business model <i>Strategy R3, R4</i>
	Reluctance to participate in government/IOU programs due to training requirements and administrative burdens	Make gradual program improvements that increase energy savings and decrease incentives while transforming the market <i>Strategy R1, R4, R5</i>

R1. Improve and streamline program to increase energy savings and reduce program costs.

Objective: Increase program value and enable market transformation

As the whole house program increases in uptake, BayREN will focus on improving the energy savings and reduce costs. Initial efforts were designed to ramp up the program and create demand of whole home upgrades and supply of a trained Participating Contractor base. The upcoming years will focus on transforming the market and eventually scaling back incentives. This requires program streamlining and review of measures, as well as reevaluating delivery approaches.

While the ultimate goal is incentive step down, the next five years will be oriented to delivering a customer-centric program, or customer journey, that allows contractors to provide what a customer needs, when they need it. This will require iterative and dynamic program management, working closely with contractors to make sure that their business models can support changes and that homeowners are responding. This approach builds on the EBEE Action Plan Strategy 3.1.1 Sustainable and Effective Program Delivery as well as Strategy 2.2.1 Enhanced Program Design and ME&O. As an example of how this may evolve, the Home Upgrade Working Group is discussing the potential of expanding program eligibility to a three year time period, maintaining a preliminary baseline and allowing homeowners to phase in their upgrades overtime without having to enter and close out projects multiple times. This concept was developed with contractors and program administrators and will be further considered for feasibility in 2017.

The table below outlines the BayREN plan that will increase energy savings and cost effectiveness and lead to market transformation.

	Short Term: 1-3 years	Mid Term: 3-6 years	Long Term: 6+ years
Primary Program Goal	<ul style="list-style-type: none"> ● Increase Project Numbers ● Increase trained Workforce (esp. Specialty Contractors) 	<ul style="list-style-type: none"> ● Increase Energy Savings, particularly kilowatts (KwH) ● Increase the activity and energy savings of participating Contractors 	<ul style="list-style-type: none"> ● Robust, stand alone whole house energy efficiency market
Incentives	<ul style="list-style-type: none"> ● Robust incentives to increase project numbers and contractors involved 	<ul style="list-style-type: none"> ● Maintain incentives for at least 2-3 years with a gradual decline to year 8. ● Alter points on measures to give preference to certain measures that yield better savings 	<ul style="list-style-type: none"> ● Deeply reduce incentives to none.
Tactics	<ul style="list-style-type: none"> ● Build trust and network of contractors ● Develop marketing & communication tools ● Work out program issues and further streamline process ● Home Upgrade Advisor (HUA) 	<ul style="list-style-type: none"> ● Further development of specialty/Whole House Contractor skills ● Explore and implement supportive incentives for electric savings ● Develop behavior element to program utilizing smart tools (Meter, Smart Phones etc.) ● Increased activation of the Energy Raters and BPI Analysts to help scope broader energy improvements such as plug loads, lighting, appliances, etc. ● Increase role of HUA to encourage increased measures and then to follow up post-project for future potential. ● Reduce burden on contractors by educating homeowners about whole home upgrades ● Educate customers and contractors about EE financing options ● Green Labeling and Home Energy Score 	<ul style="list-style-type: none"> ● Transition program from Whole House to a Zero Net Energy Existing Homes program utilizing same administrative infrastructure ● Expand relationships with solar and EMS providers ● Reach back to customers to help them achieve ZNE

R2. Reposition Home Upgrade Advisor as a stand alone program, expanding services to educate and assist contractors and homeowners.

Objective: Homeowners and contractors increase participation in the Home Upgrade Program.

“Moving forward, energy efficiency programs should provide effective, modular approaches to customer engagement by addressing each customer’s needs and situation with common sense, straightforward suite of options....Implementers can help to make energy efficiency improvements more attractive by allowing for phased improvements and providing technical assistance and guidance about how to sequence improvement over time, keeping in mind the importance of building science and best practices.”¹⁷

The Home Upgrade Advisor will be expanded to become a stand alone, non-resource program and a central tool to expand the effectiveness of the Home Upgrade program. Advisors will continue to provide the same level of service as they currently do, but will expand their engagement with homeowners and contractors to include such topics as behavior change practices, smart home applications, and tools that can reduce kWh. Perhaps the most important change is that Advisors will become a critical piece of a customer’s journey - long-term engagement with homeowners to help them move along a path to deeper and deeper energy savings as envisioned in the EBEE Action Plan Strategy 2.2.5 Strategic Energy Planning. Further, the Advisors will begin referrals for the IOU and State Low Income Programs.

Home Upgrade Advisors are Building Performance Institute (BPI) certified and serve as a support and lead generation tool for Home Upgrade Contractors. Advisors assist contractors with program questions and assist homeowners with pursuing a whole home upgrade, thereby achieving Strategy 2.2, Customer-Focused Energy Efficiency in the EBEE Action Plan. Advisors also make referrals to complementary programs offered by IOUs, local jurisdictions, water districts and to financing programs (SB 350 S.8.5). Home Upgrade Advisors follow up on leads generated from outreach efforts and provide one-on-one support to contractors throughout the upgrade process, and in so doing, building on the EBEE Action Plan Strategy 3.1 Streamlined and Profitable Industry.

R3. Provide complementary offerings that drive leads and help to convert those leads to Upgrades.

Objective: Reduce upfront barriers to Whole House Upgrades

To break through market barriers, BayREN will create program add-ons that help contractors and homeowners realize the value of whole-home upgrades. This will include the layering of financing programs, use of technology and smart-home products, marketing and education via the Home Energy Advisor, and home ratings such as the Home Energy Score (see more details under Green Labeling). Given the high cost of upgrades and the slow return on investment, these program add-ons will provide benefits that can be realized early on in the whole home upgrade process while also reducing the upfront costs. In addition, program incentives will be shaped and evolve over the Business Plan time period to encourage measures that provide the greatest energy savings in the areas most desired.

Through the Home Upgrade Advisor and local marketing, education and outreach, BayREN will provide contractors and homeowners with information and resources regarding the multiple financing offerings; they HUA will also leverage the support of the statewide Go Green Financing program.

¹⁷ CEC, “Existing Buildings Energy Efficiency (EBEE) Action Plan”, page 63.

The Bay Area is uniquely set in one of the most technology driven regions of the country. Use of smart home technology can help homeowners to actively participate in saving energy inside their home and realize a quicker benefit than they might with only a whole home upgrade. Disconnected homeowners do not understand the value of whole home upgrades and prefer to make cosmetic upgrades to their homes that have already been proven to yield a high return on investment. While it may take several billing cycles to see a reduction in energy costs, smart home products when combined with whole home upgrades can show immediate benefits.

BayREN also plans to leverage its BayREN Green Labeling program by enhancing Home Upgrade with the Home Energy Score (HES) rating. Described in more detail in the Green Labeling section below, BayREN will offer incentives to homeowners who have their home rated and refer them to the Home Upgrade program as a solution to increasing their homes rating.

R4. Increase number of trained whole-house, building performance contractors.

Objective: Establish a robust industry to support whole house upgrades into the future.

With 3 years into the 10-year commitment to Home Upgrade, BayREN's approach to contractor recruitment and development will evolve with the needs and opportunities provided by the Program. The current focus is on recruiting specialty contractors to the program and building their home performance training and qualifications. Moving forward, the focus will be to further develop the skills and business models of the current contractor base so that they are making whole home retrofits a central part of their business models. In addition, BayREN will work with participating contractors who have satisfied program requirements to determine how they can deliver a greater number of jobs and deeper savings.

BayREN offers a Core Contractor Training program and specific online training to educate contractors about the particulars of the BayREN program. Moving forward, training resources may expand or leverage existing Workforce, Education and Training ("WE&T") offerings related to building a home performance business, sales training, and other similar offerings that will help contractors become more successful and profitable. This will include increased Home Upgrade Advisor support to contractors and additional technical trainings to expand the skills of the workforce, and to help reach deeper energy savings.

R5. Leverage local government role as a trusted messenger to expand reach and collaboration.

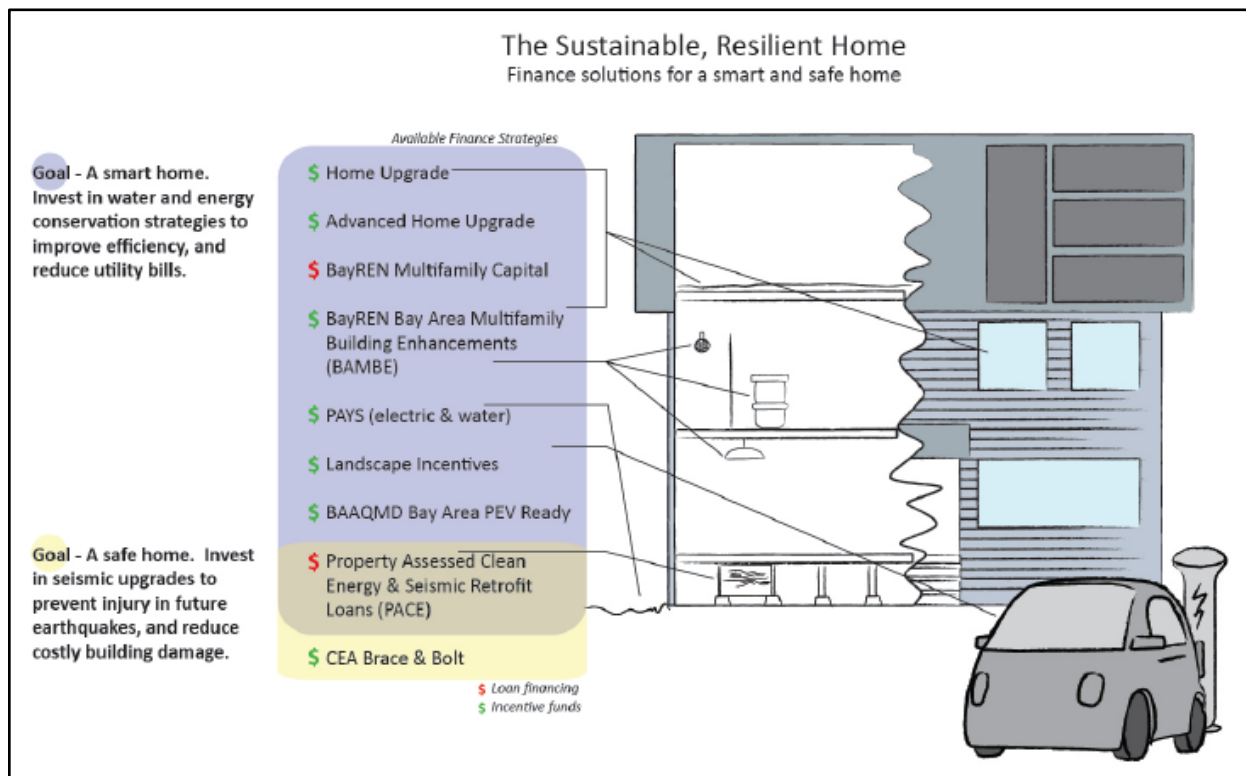
Objective: Increase number of projects and innovative approaches to upgrade homes.

The BayREN, as a collaboration of local government implementers, is uniquely positioned to address the needs of homeowners and contractors. This can be done through our marketing, education and outreach, partnerships and collaborations with other agencies and providers, as well as public perception as a trusted messenger.

As a local government entity, the BayREN can leverage other programs and agencies to expand benefits to homeowners that may not be available for a IOU only program. The BayREN will leverage Local Government Partnerships, Community Based Organizations and member agencies to expand outreach

efforts and connect with homeowners as a trusted messenger. The BayREN also offers its Water Bill Savings Program (formerly BayREN PAYS® - see Cross Cutting) in partnership with participating water utilities to deliver water efficiency improvements as part of water utility service, and allows certain cost-effective energy measures to ride along on the water bill surcharge mechanism. BayREN is developing stronger relationships with other agencies such as the ABAG resiliency program and the Bay Area Air Quality Management District to create new cross-promotional products such as the “Resilient Home”, which will leverage the Home Upgrade program and pair it with earthquake retrofits (See Figure 5). Similarly, the BayREN is investigating testing approaches for Community Scale retrofit programs that integrate water, waste and alternative transportation. The intent is to continue to innovate with small scale efforts and test the feasibility to increase to a mainstream effort that can be adopted throughout a REN or Utility territory.

Figure 6. The Sustainable, Resilient Home



Single Family Pilots and Innovation

Several of the program elements described above are program innovations that will be newly piloted within the ten year business plan period. Details and elements of these efforts will be more extensively described and outlined in Implementation Plans as they are launched.

- ZNE for Existing Residential Single Family Homes

- District Level EE and ZNE
- Resilient Homes
- Long-term Customer Journey program

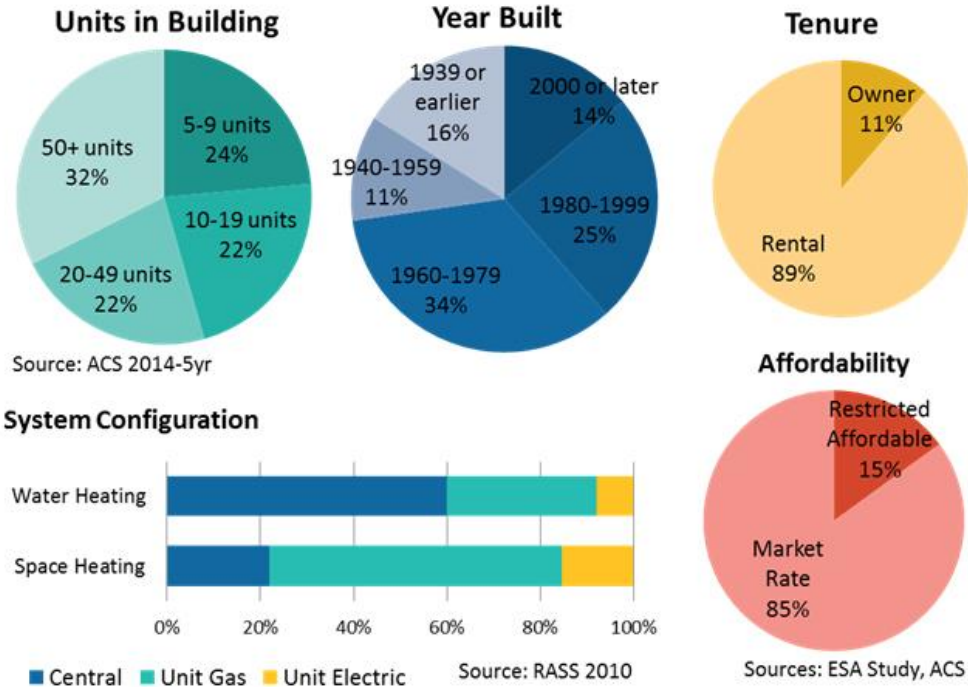
MULTIFAMILY SUBPROGRAM

The Bay Area Multifamily Building Enhancement (BAMBE) program provides multifamily property owners with a range of services aligned to their business needs and capital resources to promote adoption of energy efficiency upgrades. The property owners enroll in a technical assistance program designed to lower barriers to multi-measure, whole building upgrades by providing technical and financial assistance. BAMBE serve as a complement to a whole-building utility rebate program and will reduce cost barriers for multifamily property owners who would like to conduct energy efficiency upgrades. The program also conducts workforce development for specific multifamily building trades.

Market Characterization

In the Bay Area there are over 700,000 housing units in multifamily buildings with 5 or more units. This represents 25% of the Bay Area housing units, and represents almost a quarter of statewide multifamily units (2014 ACS). The building stock is diverse in size, age, ownership, and energy system and metering configuration.

Figure 6: Bay Area Multifamily Sector ^{18,19}



Serving a diverse multifamily sector requires a customized, flexible offering and multiple market drivers. Because program designs that work in other sectors have not found similar uptake in the multifamily sector, the sector has been considered hard-to-reach. Yet programs customized to the sector have the opportunity to realize significant savings. National and statewide studies have shown that existing multifamily housing has the potential to save 30% of its energy usage through cost-effective upgrades. The diversity of the building stock means each case is unique and requires a flexible approach that can fit the building’s existing condition and needs, and speaks to its core business motives. While direct financial incentives may be attractive across the sector, other market drivers are most salient to specific sub-sectors.

According to the EBEE Action Plan, within California multifamily housing stock the highest energy uses are space heating (22%) and water heating (39%). While on average only about 500 kWh is used for space conditioning and water heating, electric fuel for space and water heating is more common in multifamily than in single family. The average multifamily household in California uses 3,700 kWh a year, lowest among housing types with the majority being baseload energy use.²⁰

¹⁸ Owners of rental properties include individuals, corporations, nonprofits, and other entity types. While only 15% are restricted affordable housing, statewide 37% of multifamily units are occupied by low-income households. Sources: EBEE Action Plan and Energy Savings Assistance Program Low-Income Market Segment Study, Cadmus

¹⁹ Although data on central versus individual metering configurations are unavailable, almost all units must be individually metered for electricity. Gas metering usually depends on system configuration and master metering is more common than for electricity.

²⁰ CEC, “Residential Appliance Saturation Survey (RASS)”, 2010.

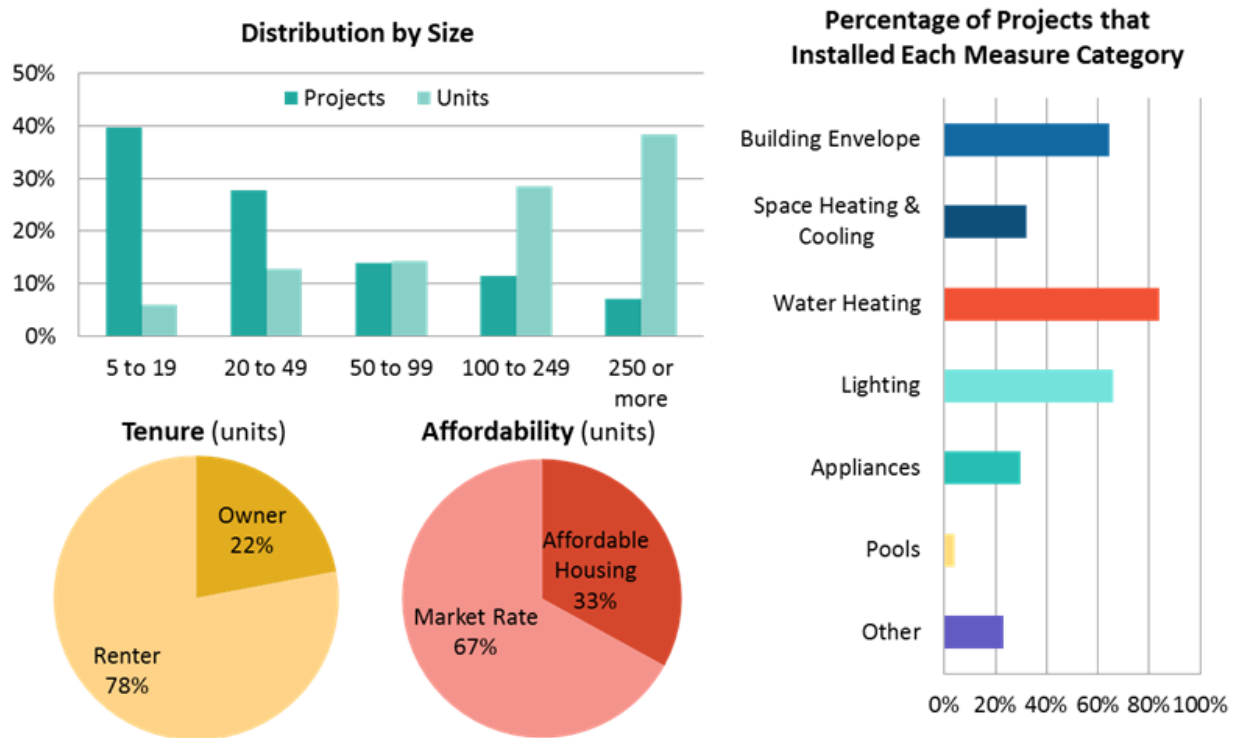
The target decision maker in a multifamily whole building upgrade is the property owner or delegated manager. In rental properties, which constitute the majority of the housing stock, the property owner/manager operates their property as a commercial asset and evaluates investment decisions based on financial impacts. Yet the end uses are distinctly residential, resulting in different savings opportunities than commercial properties. Property owners typically undertake building improvements during certain trigger events and develop capital investment schedules over time. They require a minimum return on their investments and demonstrated financial value to their net operating income in the form of lowered operating expenses or increased revenues. The market is still relatively new to energy efficiency and has a low tolerance for complicated new procedures. Streamlining the participation process and offering a lot of customized hands-on assistance helps participants engage in a whole building upgrade. Helping owners integrate energy efficiency into their long-term plans aligns energy efficiency with their existing business practice and creates an opportunity for ongoing engagement.

The program served properties with both central and individual systems. The participation of projects with individual systems and metering indicates the program's success at overcoming the split incentive barrier. Of completed units for which the heating system details were recorded, 27% had central space heating; 44% had individual gas and 29% had individual electric. Central water heating was more common, as is the case in the housing stock, with 85% of completed units with recorded DHW details having central systems; 14% had individual DHW systems.

BAMBE was specifically designed to target more than one upgrade to encourage a range of building systems to be addressed at the same time. The program data show that BAMBE participants in 2013-2015 upgraded an average of 4.5 measures in 2.5 categories. The distribution of ex-ante claimed savings are relatively reflective of the energy end uses in multifamily properties.

The BAMBE model has successfully served the market's diversity. The portfolio of completed projects is as diverse as the housing stock. The program has struck a balance between incentivizing large properties that yield a high volume of units and savings, and reaching a good representation of smaller buildings. Consistent with the housing stock, the majority, 78% of completed units were renter-occupied. The unusual accomplishment is the participation of owner-occupied properties which have previously been difficult to serve due to their complicated and distributed decision making. The program served both market rate (67% of completed units) as well as affordable housing (33%).

Figure 8. BAMBE Completed Projects



Multifamily Intervention Strategies

“The multifamily housing sector is different from other sectors in fundamental ways. Energy saving goals cannot be accomplished by expanding single family or modifying commercial building approaches.”²¹

The following section provides detail on the key Intervention Strategies for the multifamily sector. Below is a summary chart outlining how the problems identified in the previous section will be addressed.

Problem	Market Barriers	Strategy
The multifamily sector is diverse in building, occupancy, and ownership characteristics making it difficult to efficiently target and address the sector	Unique and multiple needs and requirements	Customized technical assistance and flexible scopes qualifying for rebates <i>Strategy R6</i>
	Multiple market drivers influence decision making	Introduce policies, green labeling, and diverse financing products <i>Strategy R8, R9</i>

²¹ CEC, “EBEE Action Plan”, 2015, page 11.

The multifamily is residential in occupancy but operated like commercial and property investment decisions are based on financial motives	Low tolerance for upfront transaction costs	Simplify program process and requirements and offer no-cost upfront technical assistance <i>Strategy R6</i>
	Requires short ROI or payback period	Offer incentives until substantial portion of market has adopted energy efficiency <i>Strategy R6</i>
	Capital investment occur over time	Align energy upgrade recommendations with long-term capital improvement schedules by developing multi-phase deep energy savings (or ZNE) investment plans <i>Strategy R7</i>
	Reduced operating expenses or increase revenue must be demonstrated	Introduce green labeling as a mechanism to make energy efficiency visible and valuable in the market <i>Strategy R9</i>
	Multifamily owners will not engage if perceived as a competitive disadvantage	Flatten the playing field by introducing local government policies in a regionally coordinated manner <i>Strategy R9</i>

Strategy R6. Continue BAMBE streamlined technical assistance and rebate program model.

Objective: Expand program uptake until substantial market share demonstrates viability of whole-building upgrades

The 2013-2015 BAMBE program exceeded enrollment and completion expectations. It demonstrates an effective model for achieving multiple-measure upgrades in every segment of this hard to reach sector. BAMBE offers streamlined, program-provided technical assistance and a flat per-unit rebate for any scope that meets the minimum savings and measure count requirements. The program was designed to address several aspects of our defined problem statement. Specifically, it addresses the sector requirements for a customized, flexible offering; low transaction costs by offering no-cost up-front technical assistance and simplified program participation requirements; and sufficient incentives to make the project financially justifiable. The offering was designed based on property owner input and aligns with the Multifamily Home Energy Retrofit Coordinating Committee (MF HERCC) recommendations.

The BayREN’s first strategy is to continue the popular BAMBE streamlined technical assistance and rebate program model to reach substantial market penetration (5-10%). The industry seeks best asset management practices and BAMBE aims to reach a significant enough market share to demonstrate the viability of multiple-measure upgrades, highlighting diverse case studies.

Strategy R7: Focus on building on-going, long-term relationships with property owners through ZNE investment planning and operational savings.

Objective: Enable multifamily property owners to optimize trigger points and capital resources effectively.

The multifamily sector typically undertakes building improvements over time, aligning with certain trigger events and as capital resources become available. To align with this practice, the BayREN program will focus on building on-going, long-term relationships with property owners through excellent customer service, Zero Net Energy (ZNE) investment planning and operational savings. Extending program cycles beyond one year authorizations will allow the program to assure the property owner of future assistance and facilitate trust building between the program and property owner.

ZNE investment plans include phases of upgrade scopes that are planned to occur sequentially to result in the deepest energy savings possible at that site. The plans will be used as schedules for re-engaging the property owners when the planned date for the next phase is approaching. The program currently offers ZNE planning for interested property owners. We will continue this offering through TA services and build a portfolio of 20-40 projects with ZNE plans to establish the model of following up over time. As the timing for the next phases of ZNE plan scopes approaches, the program will introduce an incentive structure specifically for the second or third phase. Within the 10 year horizon, the program aims to incentivize its first projects to complete their full ZNE plans.

The core of a long-term engagement strategy is relationship building. The BayREN has already establishing lasting relationships with property owners and portfolio owners. Portfolio owners in particular have the potential to upgrade project after project over time. Ongoing relationships also allow conversations about operational savings which are currently left on the table. While engaging with hundreds of property owners through BAMBE technical assistance, the program gained insights into how to evolve the program offerings to target deep energy savings over time required to meet state and local energy efficiency and climate goals.

Strategy R8. Introduce other market drivers, specifically local government policies, green labeling, and access to financing.

Objective: Adoption of local government policies and presence of other market-based mechanisms that encourage building upgrades.

Once a substantial market share has demonstrated the viability of whole-building upgrades, BayREN plans to shift its focus to supporting market-based mechanisms that require less ratepayer funding over time. Specifically, BayREN plans to advance local government mandatory policies, green labeling initiatives, and access to private-sector financing. This market-focused strategy could be broadened to encompass other market mechanisms that are identified to be potentially effective and meaningful to the market overtime. BayREN anticipates adjusting its existing technical assistance and incentive offerings to complement these drivers. For example, it seeks to align technical assistance with requirements of local government policies, or to support green labeling through an aligned incentive design.

Local government policies

The BayREN will assist local governments to pass appropriate policies to require multifamily property owners to disclose their energy usage or system characteristics (e.g. through an audit report) and/or undertake upgrades. The type of policy will depend on each jurisdiction's goals and political dynamics. Policies may require benchmarking, audits, or upgrades. They may apply to all or a portion of the multifamily housing stock based on variables such as size or age. They may be triggered by certain events like sale or rental of a property, or may apply to all applicable properties by a certain compliance date. The BayREN members will begin in the short-term with recognition of the many successfully completed BAMBE projects and build a case for normalizing energy efficiency practices in the industry. At the same time, the BayREN will develop policy tools for the multifamily sector, which will be use in the mid-term to support local governments in adopting policies. Technical assistance services and incentives will be continued and aligned to support property owners with policy compliance.

Green labeling

The green labeling strategy aims to increase market value for energy efficiency properties and green operating and maintenance practices. The BayREN will engage real estate brokers, partner with green labeling programs and industry platforms, such as tenant-oriented sites and apps. Success will be measured by an increase in the number of green labeled properties and studies that demonstrate a tangible value add for adding a green label to the property. (This strategy is discussed in more detail in the Green Labeling section below.)

Multifamily financing

Financing is a mechanism to bring in more private capital into funding energy efficiency scopes, allowing programs to reduce direct incentive expenditures. There is potential to leverage financial trigger events, such as refinancing and recapitalization events, and insert energy efficiency scopes. The multifamily lending industry is diverse like its housing stock, and successful strategies need to address this diversity. With this in mind, BayREN introduced the Bay Area Multifamily Capital Advance Program (BAMCAP) which was designed to be flexible and work with existing industry lending practices. BAMCAP has successfully closed loans in a sector where other products have struggled to gain a foothold, but the program is resource intensive and its overall capital pool is insufficient to fully test the market potential for the program design.

The BayREN also offers its Water Bill Savings Program (formerly BayREN PAYS® - see Cross Cutting) in partnership with participating water utilities to deliver water efficiency improvements as part of water utility service, and allows certain cost-effective energy measures to ride along on the water bill surcharge mechanism.

Through its activities engaging private lenders in these programs, the BayREN has grown its understanding of the lending landscape and existing and potential products that energy efficiency projects can leverage during a financial trigger event. Through various tactics that depend on how the industry evolves, BayREN will support and facilitate private lenders' movement toward offering attractive and accessible financial products that encourage energy efficiency.

Pilots and Innovation

Multifamily Pilots: Several of the program elements described above are program innovations that will be newly piloted within the ten year business plan period. These are described in more detail above, and listed here for reference.

- ZNE investment plans
- Operational measures
- Local government policies
- Green labeling
- New incentive and financing structures

GREEN LABELING

The Green Labeling Program is an expansion of an existing program element to become a stand alone non-resource program to support and increase savings in the single family and eventually multifamily programs. The Green Labeling program will build upon and expand its work in the single family sector, where it anticipates that there is greater potential for energy savings—single family homes account for 75% of the Bay Area’s housing units. Also, research has already documented the value of green labels for single family homes, which is likely to help green labeling gain acceptance among homeowners, buyers and the real estate and financing industries.²²

In the mid to long-term phase of this business plan, the Green Labeling program will build on the experience and lessons learned in the single family sector and expand to include multifamily properties. There is currently no standardized way for owners of existing multifamily properties to convey an apartment’s green or energy efficiency features to tenants or prospective renters. A standardized green label that is affordable and relatively easy to provide could make benefit multifamily property owners in many ways, including increasing tenant retention and potentially receiving higher rents for energy efficient units.²³

In addition, a multifamily green label could make it easier for renters to identify healthier, more comfortable and more energy efficient homes. Recent real estate and apartment industry surveys reveal trends that the renter population is more permanent and likely to grow compared to single family homeowners. If today’s renters remain renters much longer than previous generations, it is likely they will increasingly seek amenities similar to what they would expect from single family homes, such as green and energy efficiency features.

Market Characterization

Please see previous sections on single family and multifamily markets.

Green Labeling Intervention Strategies

Building labeling and rating systems allow property owners, buyers, renters, lenders and other actors in the real estate transaction chain to better understand how a building with energy efficiency and other green features compares to non-upgraded buildings. By evaluating a building’s physical characteristics and not

²² A 2012 study by researchers at UC Berkeley and UCLA, “The Value of Green Labels in the California Housing Market,” found that homes in California labeled with Energy Star, GreenPoint Rated or LEED sell for a premium compared to non-labeled homes. The report is available at www.stopwaste.org/about/news/homes-green-labels-sell-more.

²³ Eighty-nine percent of renters are willing to pay \$25 or more in rent per month for a green apartment (Strata Research, “Green Renter Survey Executive Report,” 2011).

attempting to capture operational issues related to the lifestyle and behaviors of the residents, labels can be useful during a sale transaction where the occupancy is changing.

The following chart outlines key problems and intervention strategies to addressing them.

Problem	Market barrier	Strategy
Real estate agents are typically buyers' most trusted source of information about property purchases, rentals and upgrades, but most agents are unable to communicate the value of green and energy efficiency features.	Buyers spend significantly more money on building improvements in the first two years after buying a property than in subsequent years.	Train real estate agents so they can help clients' make better-informed decisions about investments in energy and green upgrades. <i>Strategy R10</i>
	Buyers are unaware of energy efficiency-related incentives or financing programs.	Train and support real estate agents, appraisers and mortgage lenders so they can connect clients with appropriate resources. <i>Strategy R10</i>
Lack of transparency and standardized data means that energy efficiency features are largely invisible to buyers and real estate professionals.	Buyers and renters who want information about energy efficient and green buildings do not know where to turn or which sources are credible.	Increase access to green labeling programs and increase use of green fields in MLS listings to improve transparency and credibility. <i>Strategy R11, R12</i>
	It is difficult for real estate agents, appraisers and lenders to have confidence in claims about a property's green and energy efficiency features.	Expand real estate professional training, use of green labels, and use of green fields in MLS listings. <i>Strategy R10, R11, R12</i>
	Current home energy rating programs are cost prohibitive in the context of home sale transactions or home improvement projects.	Test the use of low cost, accessible options for home energy labels. <i>Strategy R12</i>
There is limited incentive for rental property owners to invest in energy efficiency.	Prospective renters do not have information on an apartment's energy usage or environmental attributes.	Increase use of green labeling by rental property owners and on rental listing platforms to improve transparency and credibility. <i>Strategy R11, R12</i>
	Financial underwriting criteria for income properties (e.g., net operating income and debt service coverage ratio) do not currently value utility savings or revenue increases to due to energy efficiency.	Educate lenders about financial benefits of energy efficiency. Create a body of research to demonstrate financial benefits. <i>Strategy R10</i>

Strategy R10. Engage, educate and motivate the Bay Area’s real estate, rental and financing professionals

Objective: Real estate professionals discuss energy efficiency with clients and promote it as a means to increase property values

Engage, educate and motivate the Bay Area’s real estate, rental and financing professionals so they can help their clients—single family home buyers and sellers, multifamily property owners and managers, and renters—make better-informed choices about where they live and the real estate and building upgrades they invest in.

Strategy R11. Support the use of “green fields” in the Bay Area’s Multiple Listing Services (MLS) and other platforms

Objective: Standardize and increase the availability of data regarding a property’s energy efficiency characteristics

Support statewide and national efforts to consolidate information about energy efficient homes and enable automated data transfers to MLS systems and other industry platforms. Promote the use of green fields in the Bay Area’s Multiple Listing Services (MLS) in coordination with the Real Estate Standards Organization data protocols. Promote third-party platforms for home sales and apartment rentals that convey the value of green and energy efficiency features.

Strategy R12. Test affordable, accessible options for green labeling

Objective: Drive demand for energy efficiency upgrades by making efficient and green features more transparent to the market

Test affordable, accessible options for green labeling to drive demand for energy efficiency upgrades and make energy efficiency and green features more transparent to homeowners and buyers, multifamily property owners and managers, renters, building contractors, and the real estate and financial professionals who facilitate transactions.

Home Energy Score in the Bay Area

In 2015, after analyzing various alternatives, BayREN member StopWaste began offering HEScore, a U.S. Department of Energy (DOE) program, in the Bay Area through an official partnership with the DOE. The HEScore report provides a critical link between information and action. HEScore uses a simpler metric similar to a vehicle’s mile-per-gallon rating. Single family homes are scored on a scale from 1 to 10 relative to other homes in the same climate zone, with 10 representing a highly efficient home and 1 representing a low efficiency home. The score reflects expected energy performance based on the home’s building energy efficiency characteristics.

BayREN has funded the recruitment and training of HEScore qualified assessors, development of HEScore program protocols, and creation of a customized energy efficiency upgrade recommendations report that aligns with the Home Upgrade program. Along with the score and customized report, BayREN’s Single Family program provides homeowners with associated energy and cost saving estimates, and referrals to home upgrade programs, incentives, and financing tools.

BayREN's Green Labeling program will build on the current HEScore program by carrying out these activities:

- Expand availability of the Home Energy Score program throughout the region
- Continue training and supporting contractors and other building professionals to serve as HEScore assessors
- Offer Home Energy Score incentives to promote voluntary participation
- Support contractors in marketing HEScore as a pathway to efficiency upgrades
- Develop tools to streamline HEScore quality assurance and field data collection/submittal for home inspectors
- Bundle Advanced Home Upgrade assessment incentive with HEScore
- Test ways to improve the affordability and accessibility of green labels for multifamily buildings

In the mid-term of the program, EM&V could include an evaluation of the follow up from Home Energy Scores provided at time-of-sale. This would help determine the effectiveness of Home Energy Score as a lead generator for completed home upgrades. The analysis could be combined with evaluation of the BayREN Single Family program.

The later stage of the Green Labeling program (years 8 to 10) includes activities designed to evaluate the value of labeled homes. This may include a follow-up study to the report, "The Value of Green Labels in the California Housing Market." This 2012 study by researchers at UC Berkeley and UCLA provides an economic analysis of the impact of green labeling on the sales price of homes. The researchers found that homes in California labeled with Energy Star, GreenPoint Rated or LEED sell for a premium compared to comparable, non-labeled homes. This was the first rigorous, large-scale independent economic analysis of the value of green homes in California.²⁴

BayREN is proposing to support a follow-up evaluation that includes existing homes after enough time has elapsed to do a fair analysis of the potential impact of HEScore, other labels or documentation of completed energy upgrades on home sale prices. A similar analysis could potentially be done for multifamily buildings when sufficient labeled building stock is available.

²⁴ Report available at: www.stopwaste.org/about/news/homes-green-labels-sell-more

Supporting Functions

EM&V Efforts

The BayREN, unlike the IOUs, operates a very limited portfolio of programs that by the CPUC's mandate,

BayREN Responses to 2013-14 EM&V Studies

Single Family Data Quality and Tracking: BayREN feels that a better platform for communication of expectations regarding reporting should be implemented to enhance consistency. BayREN is working to ensure our data sources are aligned and in agreement when submitted to the CPUC. We have set up an internal process to conduct data quality checks on a quarterly basis including running data through the Cost Effectiveness Tool (CET) for quarterly reporting. The single family sector will cooperate in tracking costs associated with both resource and non-resource activities.

Multifamily Data Collection: The multifamily sector currently lacks access to whole building aggregate energy usage data due to IOU technological limitations or policy restrictions. The BayREN will cooperate with efforts under AB 802 compliance to obtain this meaningful level of utility billing data. This data will allow for a reconciliation of modeled savings as well as monitoring actualized savings over time.

Multifamily Internal Performance Analysis: The BayREN's Multifamily program is designed specifically to respond to continuous internal performance analysis and be adjusted accordingly. The primary metrics the program will track include: kWh and therm savings per incentive dollar, dollars of private participant investment per incentive dollar, participant satisfaction and feedback, and how well the portfolio of participating buildings reflects the housing stock in variables such as geography, size, affordability, and vintage.

In relation to the Multifamily program, the CPUC evaluations produced recommended NTG values. Net energy savings and TRC have incorporated these recommended values.

BayREN Anticipated EM&V Study Needs

The BayREN proposes to continue efforts with the CPUC to establish and pursue appropriate methodologies to evaluate BayREN's programs in the context of hard to reach markets and the State's and local climate goals, including the following Non-Energy Benefits:

- Carbon and other GHG reductions
- Contractor services
- Health and indoor air quality
- Climate resilience

Marketing, Education & Outreach

BayREN’s unique organizational structure as a collaboration of the 9 Bay Area counties has enhanced the success of its programs through our perception as trusted messengers. As local governments, we are known and trusted by the local communities and have a long track record of delivering successful program and services. Local governments may also leverage marketing and outreach strategies with other local programs providing a full offering to consumers and contractors. There are 101 cities within the 9 BayREN counties that can serve as program partners and further customize the message of energy efficiency and the whole home concept. Furthermore, local governments may leverage partnerships with community based organizations and other sustainability and energy related local initiatives. BayREN also works closely with the Statewide ME&O Energy Upgrade California program and coordinates marketing efforts where possible.

Workforce Development, Education and Training

As discussed earlier, BayREN offers a Core Contractor Training program and specific online training to educate contractors about the particulars of the BayREN program. Moving forward, training resources may expand or leverage existing Workforce, Education and Training (“WE&T”) offerings related to building a home performance business, sales training, and other similar offerings that will help contractors become more successful and profitable. This will include increased Home Upgrade Advisor support to contractors and additional technical trainings to expand the skills of the workforce, and to help reach deeper energy savings.

Key Partners/Coordination

The BayREN will work with, partner and coordinate with a number of State, Regional and local government agencies, as well as Bay Area specific groups related to energy and climate change. Groups include, but are not limited to:

- Bay Area Cities and Counties
- IOU and PG&E Coordination
- PG&E Local Government Partnership Programs
- California Solar Initiative
- Community Service & Development (CSD) Weatherization and Low Income Programs
- Community Choice Aggregation (CCA) energy efficiency programs
- Municipal utility programs
- Water Utilities
- Financing Programs

- Other government demand side energy programs (EE, DG, EV, etc.)
- Local Trade and Real Estate Associations, Workforce Investment Boards, Retailers, Suppliers
- Green Building Labeling Organizations
- Community Based Organizations, Religious Institutions, Educational Institutions

Cross-Cutting

BayREN Water Bill Savings Program

The BayREN also offers its Water Bill Savings Program (formerly BayREN PAYS®). Water and energy efficiency are currently siloed, when leveraging them together could enable greater savings in both resources. The PAYS® model delivers efficiency improvements as part of utility service, and allows certain cost-effective water and energy measures to be installed and repaid through an efficiency charge on the utility bill.

The BayREN Water Bill Savings Program works with partner municipal water utilities (Partner Utilities) to facilitate efficiency services (Services) that provide hard to reach customer classes with on-bill upgrades for cost effective measures. Consistent with EEBE Action Plan Strategy 5.4.3 to provide alternative models for streamlined delivery of efficiency solutions, Water Bill Savings Programs implemented by Partner Utilities offer customers a simple path to install energy- and water-saving technologies with no up-front cost. Participating customers pay for measures through a monthly tariffed “efficiency charge” attached to their utility meter, with the assurance that their total utility bill savings will exceed program charges. Current BayREN Partner Utilities include the Town of Windsor, the City of Hayward and East Bay Municipal Utility District (EBMUD), and BayREN is proposing to expand partnerships through a regional model to include 10 Bay Area water utilities in the short term (i.e., 1-3 years), 20 utilities in the medium term (i.e., 4-7 years), and 40 utilities in the long term (i.e., 8-10 years).

BayREN Residential Sector Metrics - Detailed

Energy Efficiency Business Plans: Sector Metric Table - Residential Sector									
Problem Statement	Market Barriers	Desired Market Effects/ 10-year Vision	Intervention Strategies	Market Effect Metrics	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
Homeowners do not understand the value of upgrades; Insufficient numbers of whole-house, building performance contractors	<ul style="list-style-type: none"> -Uneducated homeowners and contractors -Lack of alignment with needs and interests -Upgrades are expensive -Slow contractor engagement -Training and administrative burdens on industry 	Market demand for whole house upgrades achieves a high enough volume to discontinue incentives and maintain a robust industry	<ul style="list-style-type: none"> R1. Improve & Streamline Program R2. Complimentary Offerings R3. Contractors R4. Home Upgrade Advisor R5. Leverage Local Government 	Output: Number of units upgraded or incentives provided Output: Percent of energy savings per project	2015 baseline (0.2% of market) (11% avg energy savings)	Program tracking data	Increase to 5% of market 13% avg energy savings	Increase to 7% of market 15% avg energy savings	Increase to 10% of market 20% avg energy savings
Diverse building, occupancy, and ownership characteristics make it difficult to efficiently target and address the sector; Residential properties operated like commercial; property investment decisions are financial motivated	<ul style="list-style-type: none"> - Sector diversity - Multiple market drivers - Low tolerance to transaction costs - Requires short term ROI - Investment over time - Need demonstrated results - Perceived competitive disadvantage 	Multifamily property owners adopt energy efficiency upgrades as standard practice	<ul style="list-style-type: none"> R6. Improve & Streamline Program R7. Long-Term Relationships R8. New Market Drivers 	Output: Number of units touched by program services or initiatives	2015 baseline (5% of market)	Program tracking data	Increase to 15% of market	Increase to 30% of market	Increase to 50% of market
Professionals are typically unable to communicate the value of green and energy efficiency features; Lack of transparency and standardized data; limited incentive for rental property owners to invest in energy efficiency	<ul style="list-style-type: none"> - Lack of education in RE industry - Lack of standardized data about EE properties - Lack of valuation of EE 	Demonstrated value-add for EE properties in real estate transactions	<ul style="list-style-type: none"> R9. Motivate market R10. Green MLS R11. Test Green Labeling Options 	Output: Number of EE upgraded properties in Bay Area Outcome: Increased value for EE existing homes at time-of-sale;	2017 level Unimproved home value	Statewide green building registry Empirical study	10% increase in number of properties	20% increase in number of properties	Quantified value for EE existing homes at time of sale