

Bay Area communities working together for a sustainable energy future.

Bay Area Regional Energy Network

2015 Energy Efficiency

Annual Report

Prepared by:

Association of Bay Area Governments

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I. Executive Summary

The San Francisco Bay Area Regional Energy Network (BayREN) is a collaboration of the nine counties that make up the Bay Area. Led by the Association of Bay Area Governments (ABAG), the BayREN builds on the expertise, experience, and proven track record of Bay Area local governments to develop, administer and implement successful energy efficiency, climate, resource, and sustainability programs. Since its inception, the BayREN has been addressing the three areas indicated by CPUC Decision 12-11-015 in the formation and implementation of the RENs: filling gaps that the investor-owned utilities (“IOUs”) are not serving; developing programs for hard-to-reach markets; and piloting new approaches to programs that may have the ability to scale and offer innovative avenues to energy savings.

To date, the BayREN programs have provided over \$17 million dollars in incentives to Bay Area property owners, and savings of 8 million kWh and 719,299 therms. The BayREN has enhanced the typical incentive program model with customer focused technical assistance, innovative financing, marketing and outreach, and capacity building services that improve uptake, satisfaction and effectiveness of the incentives. The REN model uniquely engages a significant roster of local government stakeholders to play a key role in supporting AB 32, SB 350, AB 802, and AB 758 mandates as well as design and implement demonstration projects to deliver Integrated Distributed Energy Resources (IDSR) and provide grid integration support at the regional level.

The REN model leverages local governments’ mission and ability to connect to the community and establish programs tailored to constituents’ needs. Further, the RENs have the ability to incubate new innovative program models at the local level, and scale them at the regional level with other Local Government partners and expand to even larger scale adoption. As a local government entity, the BayREN can easily partner and collaborate with multiple agencies, water utilities and other key actors to develop innovative programs that offer multiple benefits. This integrated approach to efficiency, bringing together energy and water, greenhouse gas (“GHG”) and climate action planning, community development and resiliency is a model for the future.

BayREN programs saw continued success in 2015 as highlighted in this report.

The BayREN offers services in the following four key program areas:

- **Single Family Home Upgrade.** The BayREN built on the experience and accomplishments of its members in residential programs to educate homeowners recruit and train installation contractors, enhance participation in Home Upgrade, and to drive more robust uptake in Advanced Home Upgrade. BayREN developed the Home Upgrade Advisor Program as part of the Single Family program and has successfully utilized it to drive more robust uptake in Home Upgrade and drive leads to the Advanced Home Upgrade by achieving over 50% project uptake.
- **Multifamily Upgrade.** This program fosters high market demand for incentives that require an energy upgrade scope, and encourages deeper retrofits throughout the building’s life cycle, not just at the time of a major renovation.
- **Codes and Standards.** The BayREN works with local governments to measure, monitor, and improve compliance with energy codes, as well as develop energy efficiency policies and ordinances.
- **Financing:**
 - **Multifamily Capital Advance.** The BayREN provides capital resources for upgrades to multifamily mid-range housing, allowing this hard to reach market an attractive option for implementing energy efficiency measures.
 - **Commercial PACE.** This program provides contractor training and support and program

administrator/capital provider (PA/CP) coordination to drive uptake in commercial PACE projects.

- **Pay as You Save[®] (PAYS[®])**. This program offering is an innovative water-energy nexus pilot to provide technical assistance to Bay Area municipal water utilities seeking to offer on-water-bill financing to facilitate water utility customers' installation of water efficiency and energy efficiency measures.

II. 2015 Energy Efficiency Program Overview

A. Single Family

Program Description

The BayREN is the exclusive implementer of Home Upgrade (HU) within the nine Bay Area counties. Home Upgrade, a statewide program, is a points-based, prescriptive incentive program that eliminates the need for energy modeling and reduces the number of homeowner interactions in an attempt to demystify the whole house energy efficiency upgrade approach. The Home Upgrade Program offers a balanced approach intended to produce a high volume of energy efficiency upgrades and energy savings while maintaining a reasonable level of technical rigor and quality assurance.

All projects must be performed by an Energy Upgrade California® Home Upgrade Participating Contractor. The BayREN maintains a strong commitment to its Participating Contractors, the driving force of the program. Each Participating Contractor is assigned to a personal Account Manager, who is available to assist with any programmatic questions (e.g., paperwork, eligibility), training needs, and guidance on business best practices. This personalized assistance is helpful to Participating Contractors, many of whom are incorporating home performance installations into their business models for the first time. BayREN has focused on developing the contractor base to include a large number of specialty contractors typically not engaged in this market, but with potential to expand the program's reach.

Non-Resource Programs Description

BayREN's single family program provides many non-resource benefits. Since these are a large part of program implementation, some highlights are provided.

Multi-tiered Marketing, Education, and Outreach campaign

The BayREN Home Upgrade program is supported by a Marketing, Education, and Outreach (ME&O) campaign implemented on both a regional and local level. As trusted messengers among the local communities, each BayREN member agency is responsible for local marketing activities. While tactics vary from county to county depending on the needs of the community, they primarily include a mix of homeowner workshops, presentations to community groups, tabling at community events, door-to-door canvassing and local media buys/direct mail. Counties also engage with their local Participating Contractors to include them in the outreach events. As an Energy Upgrade California program implementer, BayREN works closely with the Statewide ME&O administrator to coordinate marketing efforts.

Advanced Home Upgrade Assessment Incentive

In addition to implementing Home Upgrade, BayREN also provides major contributions to PG&E's implementation of Advanced Home Upgrade (AHU) in our shared service territory through a \$300 Assessment Incentive to help offset the cost of the requisite comprehensive energy assessment. This added incentive reduces the barrier-to-entry for customers interested in this pathway.

Home Upgrade Advisor Service

The Home Upgrade Advisor (HUA) offers both consumer-facing and contractor-facing services that provide ongoing and long-term support and education to homeowners and contractors in order to help drive program participation and deeper energy savings over time. Although not all HUA participants are interested in Home Upgrade, HUAs take a consultative approach to identify additional programs and/or services that support homeowner's goals of becoming more efficient, including complementary program referrals to different energy and water efficiency programs in the Bay Area.

Strategies and Accomplishments in 2015

- BayREN’s comprehensive and tactful ramp-up strategies in 2013-2014 yielded strong growth in 2015:
 - 129% increase in Home Upgrade incentive payments.
 - 39% increase in Advance Home Upgrade Assessment payments.
 - 32% increase in new Home Upgrade applications.
 - 28% increase in the number of Participating Contractors.
 - 10% increase in average incentive per Home Upgrade.
 - 32 Participating Contractors who submitted their first project(s).
 - Average estimated energy savings per project was 481 kWh and 102 Therms.
- In 2015, 2,104 projects completed with 1,420 Home Upgrades and 799 Advanced Home Upgrade Assessment Incentives, for a total of \$3,581,182. On average, Home Upgrade projects cost \$14,461 and received \$2,360 in incentives.

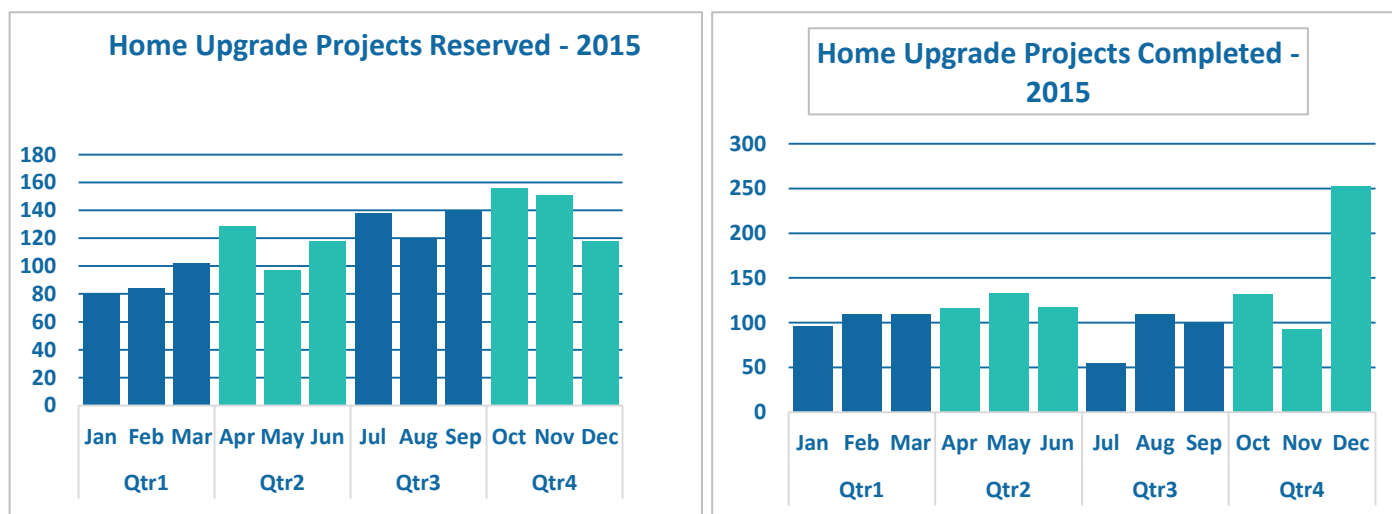


Figure 1. Home Upgrade Projects

- Deployment of a Home Upgrade Advisor: 4,090 total accounts and 2,294 referrals to complementary programs.
 - HUA tracked 205 completed projects with a 52% program conversion rate. 90 of those completed projects were done by homeowners who originally engaged with a HUA in 2013 and 2014.
 - Homeowners that worked with a HUA who completed Home Upgrade and Advanced Home Upgrade projects realized on average 23% greater energy savings compared to projects completed without a HUA.
- Six two-day contractor trainings with 73 attendees from 66 different companies.
- Launched the online BayREN Learning Center – a free training resource for Participating Contractors.
- Provided technical, business, and sales trainings for Participating Contractors.
- Organized and facilitated local marketing activities across the BayREN territory, including:
 - 49 homeowner workshops, 59 tabling events, 32 presentations, and 20 canvassing days (door-to-door outreach)
- The program website (www.bayareaenergyupgrade.org) received over 80,000 web hits with an average of

over 3 minutes spent on the site and 60% returning visitors.

B. Multifamily Upgrade

Program Description

BayREN offers the Bay Area Multifamily Building Enhancements program (the Program or BAMBE) throughout the nine-county Bay Area. This BayREN program fills an existing program gap by providing a “middle of the road” participation path for multifamily building owners. It achieves deeper and more customized savings than direct install or single measure programs, but does not carry the up-front cost of an investment grade energy assessment associated with a whole-building performance program. The overwhelmingly positive response from the multifamily sector indicates that the program has succeeded in filling this gap and taps into previously elusive savings potential. Property owners report that the streamlined and customized technical assistance and multiple-measure incentive motivates them to take a holistic approach to energy efficiency planning. BayREN continues to refine its program to encourage greater energy savings while continuing to appeal to a wide range of the market. The technical assistance also supports participation in a wide range of other existing programs through program referral. The program has exceeded its unit goals for technical assistance and incentive reservations in 2014 and 2015. Participant building types represent the diverse Bay Area multifamily market with respect to size, age, and location, affordability, and ownership types.

Strategies and Accomplishments in 2015

- Provide technical assistance to develop a customized scope of work: Served more 47,000 units in 2013 through 2015.
- Offer a simple, flat incentive of \$750 per unit on multiple measures saving 10% or more of their whole building’s energy usage:
 - Approximately 8,800 units worth of incentives were reserved in 2015.
 - 7,512 units completed upgrades, receiving \$5,634,000.00 in incentives for a total of 110 completed projects in 2015.
 - Average project size was 68 units and average estimated energy savings per project was 16%.
 - Average estimated energy savings per completed unit was 451 kWh and 32 Therms.

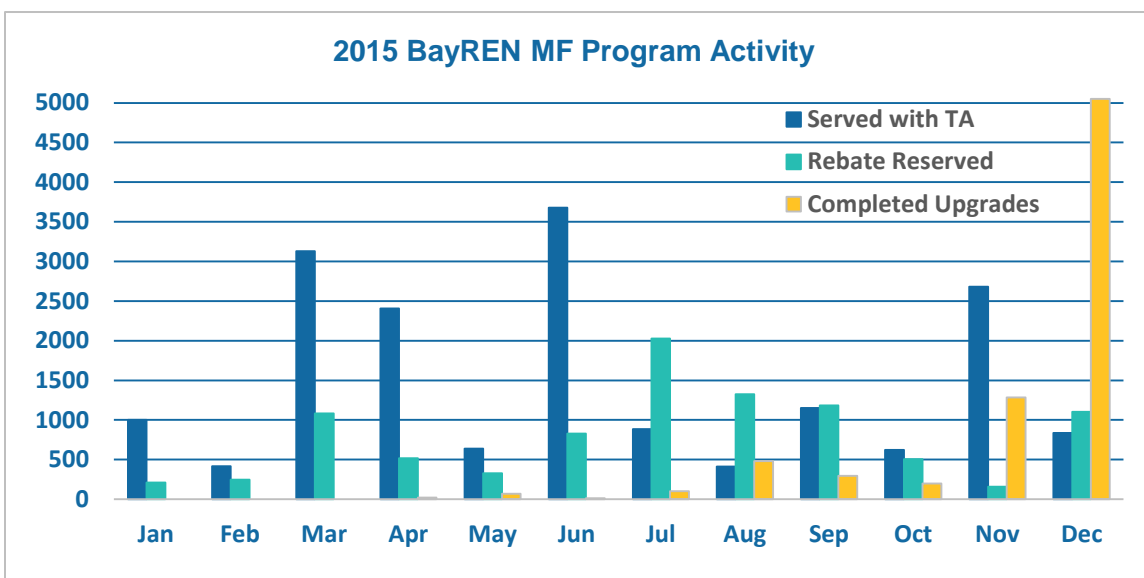


Figure 2. Multifamily Program Activity

- Referred over 1,800 units to other multifamily incentive programs in the Bay Area that was better suited for their scope of work.
- Organized and facilitated outreach events and meetings across the BayREN territory:
 - Held 212 Workshops and 6 Industry Events.
 - A total of 159 building owners or property managers attended a workshop.
 - 96 attendees completed a program interest form.

C. Multifamily Capital Advance

Program Description

The Multifamily Capital Advance program advances up to 50% of the total loan principal related to the costs of approved energy efficiency measures, at 0% interest rate to participating lenders. This arrangement results in an effective interest rate that is as low as half of the lender's interest rate, significantly reducing the cost of capital for the property owner. The program is designed to work within the larger multifamily program and minimize additional administration by leveraging the scope development and quality assurance provided by the BayREN multifamily subprogram or similar programs. The program also leverages lenders' existing infrastructure and procedures. The program utilizes an open market model to better serve the multifamily sector, which typically has limitations on supplemental loans and requires flexibility to choose their lenders.

Strategies and Accomplishments in 2015

- Engage borrowers and guide transactions: Closed 3 loans totaling \$879,287 of BayREN capital and leveraging an additional \$1.3 million in private capital.
- Enroll financial institutions: Five financial institutions have signed Participation Agreements, and two have participated in the closed loans.

D. Codes and Standards

Program Description

The Codes and Standards program was launched in mid-2013, and initiated a variety of strategies to meet its Program Implementation Plan requirements and goals. The Codes and Standards Program sought to:

- Assist in the creation and promotion of best practices at individual jurisdictions in the Bay Area to ensure compliance with energy codes and green building standards.
- Encourage building department staff and professionals to participate in available trainings related to the energy codes, enforcement processes, and best practices.
- Engage local government policymakers, sustainability staff, and building professionals through regional forums, local council meetings, and other opportunities to learn about and receive resources related to energy efficiency policy and enhancement of code compliance.
- Evaluate and characterize energy code enforcement processes, identify enforcement barriers and challenges, and develop successful energy code enforcement strategies.
- Explore new approaches to programs that may have the ability to scale and offer innovative avenues to energy savings.

Strategies and Accomplishments in 2015

- **Permit Resource Opportunity Program:** The Permit Opportunity Resource Program (PROP) was a continuation of 2014 efforts to provide on-site support to building departments interested in improving their energy plan review skills and processes. In 2015, BayREN representatives visited six city and county building departments to share recommended compliance improvement strategies, train staff on how to implement these strategies, and discuss the best ways to integrate improvements into their existing review process. Strategies were selected by building departments based on the types of permits issued and the level of interest for systemic change. In return, building departments were asked to implement a method of tracking how often associated tool(s) were used and provide feedback on the usefulness of the tools. Tools and tracking methods were generally accepted, but building departments were unwilling to commit to tracking and reporting on how often tools were used. Implementing an effective reporting process also proved difficult because each department's process for tracking projects through intake, permitting, inspection, and final phases was unique.
- **Regional Plan Check Program:** The Regional Plan Check Program was created to provide on-site support to building departments interested in improving their skills with a particular type of commonly seen permit. BayREN initiated a 10-week project to conduct on-site mentoring for plans examiners, with an emphasis on how to examine commercial tenant improvement projects. BayREN developed a Plan Review Resource Guide and a Nonresidential Tenant Improvement Energy Code Compliance Checklist. The BayREN team was able to identify a shortlist of issues that seemed to occur regularly and participating staff stated this mentoring improved their understanding of how to review nonresidential projects.
- **Electronic Compliance Improvement Tools:** In 2015, BayREN worked with five Bay Area building departments to test the effectiveness of Electronic Compliance Improvement tools. BayREN contracted with CodeCycle¹ to complete a small-scale demonstration of its online design assistance tool and iPad inspection application. Preliminary demonstration results are being reviewed to determine potential significance related to building department business processes, enforcement activities, and energy code compliance, including the potential to increase the efficiency of plan review and inspection for all parts of Title 24.
- **Trainings:** BayREN trainings are designed to educate both local officials and the private sector building community in key aspects of code compliance and enforcement. Training topics are offered as a series and each training series addresses specific energy code compliance strategies and best practices. Trainings can be delivered as a 60-90 minute Short Course or 3-4 hour Long Course. Five specialty trainings were also developed to address specialized needs of building departments from various jurisdictions. Overall, a total of 54 trainings were delivered to 552 total attendees, 232 being unique attendees.
- **Regional Forums:** Regional Forums are free half-day events held once every two months focused on resolving regional policy and program design issues from a high-level perspective. Forums bring together elected officials, appointed policy board members, local building department Chief Building Officials, and regional codes and standards advocates, for the purposes of networking and sharing best practices and lessons learned. In 2015, there were 6 forums held throughout our territory, attended by a total of 225 building industry professionals from the nine-county Bay Area. Forums included stakeholder engagement opportunities, panel sessions, and breakout groups that sparked discussions about jurisdiction-specific problems and region-wide solutions.

¹ www.codecycle.com

E. Commercial PACE

Program Description

The Commercial PACE Financing Subprogram is intended to increase uptake in commercial PACE financing available through a variety of Program Administrators/CPs in the Bay Area. BayREN supports these goals by providing advanced contractor training, education, and project development support that is responsive to the priorities of the entire range of PACE “gatekeepers” (key decision makers): building owners, first mortgage lenders, and capital providers/PACE administrators, and perhaps most importantly, contractors.

Strategies and Accomplishments in 2015

In early 2015, an RFP was written and issued seeking entities to address needs and gaps still currently present in the commercial PACE marketplace in the Bay Area. After receiving and reviewing proposals, BayREN selected Sustainable Real Estate Solutions (SRS), to support commercial PACE efforts in the Bay Area. Their scope of work that included the following components:

- Develop and deliver a recurring training program for Bay Area commercial contractors, focusing on educating them on the funding mechanics and unique programmatic landscape of PACE programs in the Bay Area region (i.e. overlapping funders/program administrators in a competitive “open market” environment), and introducing them to SRS’ technical and financial underwriting systems and tools. From May through December 2015, SRS delivered 16 trainings in 4 counties (Alameda, San Francisco, Santa Clara, and Sonoma) to over 103 individuals representing 88 unique firms.
 - Contractors were trained on the use of two reports to support their project origination and development efforts:
 - PACEcheck™ Pre-qualification Report (to pre-qualify prospects using PACE programmatic underwriting regarding property financial health).
 - 44 PACEcheck™ reports submitted.
 - 19 firms submitted PACEcheck™ reports.
 - Total submitted PACEcheck™ reports valued at \$10.1 million.
 - Project Finance Report (PFR), which is a standardized project executive summary integrating the key assumptions for PACE financing, including a detailed illustration of project benefits to meet stakeholder needs, and an independent review of the savings projections.
 - 18 projects for PFR submitted.
 - Total submitted PFR reports valued at \$5.1 million.
 - \$217,000 worth of Finance Term Sheets submitted.
- Using an innovative “success-based-fee” structure negotiated between BayREN and SRS (which reserved a large portion of program funds to cover SRS’ future costs for providing hands-on contractor assistance towards the completion of project financings), SRS is now working directly with contractor firms to develop “investor-ready” projects that are suitable for PACE financing. Leveraging their proprietary data analytics tools, standardized documentation, and robust technical evaluation (energy baselining, generating savings estimates, incorporating measure useful life data, scope refinement, financial modeling using PACE rates and terms), SRS is now working with a project pipeline valued at over \$10 million and growing.
- Since the launch of 2015 BayREN commercial PACE activities, BayREN’s impact on “Open Market” PACE in the Bay Area has four notable benefits:
 - The combination of the SRS PACEcheck™ report and Project Finance Report (PFR) have served as the

entry point for over 50 projects and a pipeline of 23 potential projects.

- An early adopter class of contractors who “get it” is emerging. These talented contractors can be counted on to deliver multiple projects year after year. Importantly, we are beginning to see from these contractors more opportunities from “B” and “C” class properties. This is most encouraging as these type properties represent the bulk of the market opportunity.
- By taking the lead to originate, underwrite and seek bids from multiple program administrators/capital providers (PA/CPs), BayREN/SRS is helping to realize the potential of the open market for C-PACE in California. While it is still early, this approach is creating a level playing field for all PA/CPs. Among other benefits it has already driven lower interest costs, closing fees and more standardized terms and conditions.
- Finally, the BayREN program is leading to the availability of financing for both smaller projects and more property types. For instance, as of May 2015, one PA/CP had a project minimum of \$1 million. By February 2016 the minimum had been reduced to \$100,000. Moreover, they expanded the offering to non-profits, churches and schools.

F. Pay As You Save® (PAYS)

Program Description

The BayREN PAYS® Program is working to support Partner Municipal Water Utilities (Town of Windsor, City of Hayward, and East Bay Municipal Utility District) implement their On-Water-Bill Financing Programs.

Implementation of these programs will facilitate at least 2,000 utility projects forecast to result in annual savings of 16,000,000 gallons of water, 35,000 therms, and 190,000 kWh (not including embedded energy from water saved). With successful Partner Utility efforts, program activities are proposed to include a regional program model in 2016.

BayREN PAYS is based upon the Better Buildings Program (DOE) funded Windsor Efficiency PAYS® pilot, where over five percent of the Town’s residential units participated in the pilot in its first year, significantly outpacing Windsor’s other conservation programs. BayREN PAYS Partner Utility programs are designed to scale and replicate the work from Windsor, and facilitate similar rapid project uptake. BayREN PAYS Program activities are focused on supporting specific Partner Utility program development and implementation and vetting general on-bill financing program components that will enhance these Partner Utility Pays (or other on-bill) Programs. Components include:

- A self-sustaining resource efficiency program in which participating customers pay for installed measures and program operation through a regular surcharge attached to their meter.
- Unique customer protections that drive program participation, including the assurance that the participant’s utility bill savings from installed measures will exceed their surcharge.
- Selection of Partner Utilities (in 2015: City of Hayward, Town of Windsor, and East Bay Municipal Utility District) based upon utilities’:
 - Ability and commitment to implement an on-bill pilot within the funding period.
 - Expressed interest to include measures that would generate sufficient water, gas, and electricity savings so that the on-bill surcharges for installed measures would still result in immediate net savings for participants.
- Customized technical assistance to address the diverse and complex needs of municipal water utilities and their customers.

Strategies and Accomplishments in 2015

- Technical assistance for City of Hayward's Green Hayward PAYS® Program for multifamily residential services, including indoor plumbing fixtures, common area energy measures that deliver savings to the property owner (lighting, hot water distribution, etc.), and weather-based irrigation controller installation, since August 2015.
- Technical Assistance for the Town of Windsor's Windsor Efficiency PAYS® Program, including:
 - Support for residential services, which have offered indoor plumbing fixtures and outdoor turf conversion to drought tolerant landscapes since October 2012 for single family and multifamily customers.
 - Support for commercial services, which have offered installation of weather based irrigation controllers and irrigation system repairs since December 2014 for commercial customers.
- Technical assistance for East Bay Municipal Utility District's Water Smart On-Bill Program, for multifamily residential indoor and single family/multifamily/commercial landscaping components approved for test projects, with field services available since October 2015.
- General program support including:
 - Development of a regional model for program delivery, identification of potential implementation barriers for the regional model (e.g., access to initial capital to fund upfront project costs), and engagement with key local stakeholder groups to overcome these barriers.
 - Research and program design updates to effectively record notice of program participation with the Sonoma County Office of the Recorder.
 - Research and outreach to engage a more diverse contractor base to support Partner Utility Programs.

III. Energy Savings

In 2015, BayREN administered two resource programs within the Residential Sector that have reported energy savings: the Single-Family Home Upgrade and Multifamily programs

Single-Family Home Upgrade

The original compliance filing goals filed in 2012 and April 2013 were based on Regional Energy Network (REN) work papers that were later not approved by the Energy Division in May 2013. Subsequently, the BayREN utilized approved IOU work papers, which produced lower goals and impacts. All Single Family Program cost effectiveness calculations in this filing use the approved IOU work paper for the Home Upgrade as the basis of energy savings.

Multifamily Upgrade

Multifamily project energy savings are based upon the EnergyPro Lite (EPL) tool developed in consultation with the Energy Division technical reviewer (Phase 1) for this program. Custom measures such as lighting are modeled using IOUs workpapers and custom calculators, as approved by the CPUC.

Table 1. Electricity and Natural Gas Savings and Demand Reduction

Electricity and Natural Gas Savings and Demand Reduction	Annual Energy Savings (GWh) ²	Lifecycle Energy Savings (GWh) ³	Annual Natural Gas Savings (MMth) ²	Lifecycle Natural Gas Savings (MMth) ³	Peak Demand Savings (MW) ²
Single Family Savings					
2013-2015 SF Savings	0.94	8.11	0.21	3.03	1.35
2015 SF Savings	0.68	5.69	0.14	2.04	0.96
Multifamily Savings					
2013-2015 MF Savings	7.16	116.02	0.51	8.20	0.70
2014 MF Savings ⁴	3.40	55.12	0.26	4.20	0.38
2015 MF Savings ⁵	3.76	60.90	0.25	4.00	0.32
Total Portfolio					
2013-2015 Portfolio Savings	8.10	124.13	0.72	11.23	2.05
2015 Portfolio Savings	4.44	66.59	0.39	6.04	1.28
CPUC Goal Adopted⁶	N/A	N/A	N/A	N/A	N/A
% of Goal	N/A	N/A	N/A	N/A	N/A
% of 4-Year Portfolio	N/A	N/A	N/A	N/A	N/A
Balance	N/A	N/A	N/A	N/A	N/A

² Annual and Peak Demand Energy Savings are total cumulative savings taken directly from program reporting databases.

³ Lifecycle Energy Savings are calculated using the Cost Effectiveness Tool (CET).

⁴ BayREN MF 2014 Savings are reported here to show the 30 projects which completed in Dec 2014, but whose savings were reported and claimed in Jan of 2015, and within the 2015 Quarter 1 report. These savings should have been claimed in Dec 2014, and within the 2014 Quarter 4 report.

⁵ 2015 MF Savings reported here represent the actual savings for 2015 and may not align with monthly or quarterly reported savings for 2015, due to the discrepancy with the 30 projects as stated above.

⁶ CPUC 2013-15 Goal for IOUs did not include BayREN-specific targets.

IV. Environmental Impacts

Environmental impacts are shown in Table 2. These results are generated by the Commission-approved Cost Effectiveness Tool (CET). The CET is designed to calculate energy efficiency program cost effectiveness. The CET is based on and uses the same cost avoidance methodology as the previously used E3 calculator. Although emission data is available through the CET, D. 12-11-015 does not direct BayREN to track emissions.

Table 2. Environmental Impacts (tons of avoided emissions)⁷

Annual Results 2015 ^{8,9}	Annual CO2	Lifecycle CO2	Annual NOx	Lifecycle NOx	Annual SOx ¹⁰	Lifecycle SOx ¹⁰	Annual PM10	Lifecycle PM10
Single Family	825.8	15109.0	1068.7	19606.9	0.00	0.00	22.7	410.2
Multifamily	3107.2	55928.7	2506.7	45120.9	0.00	0.00	235.5	4238.9
Total Portfolio	3933.0	71037.7	3575.4	64727.8	0.00	0.00	258.2	4649.1

⁷ Environmental Impacts are Gross Annual and Lifecycle Tons of Avoided Emissions

⁸ Annual Results from activity installed in 2015 only.

⁹ Environmental impacts do not include any associated with Low Income Energy Efficiency or Codes and Standards programs.

¹⁰ The avoided SOx reductions are not calculated in the CET calculator. None of the IOUs use coal power on the margin and the energy efficiency savings have impact on the margin only. This is the basis for the CET analysis as reviewed by all interested parties and approved by the Commission.

V. Expenditures

Table 3. 2013-2015 Program Expenditures

Program Name	2013-2015 Adopted Program Budget ¹¹	2013-2015 Operating Program Budget ¹²	2013-2015 Program Expenditures ¹³	Expenditures as % of Portfolio Operating Budget
Single Family	\$13,473,249	\$14,452,951	\$12,404,541 ¹⁴	27%
Multifamily	\$13,770,350	\$21,943,050	\$20,622,092	45%
Codes and Standards	\$4,623,500	\$4,981,482	\$4,291,113	9%
Financing ¹⁵	\$4,065,145	\$4,116,592	\$1,719,627	4%
Total Portfolio	\$35,932,244	\$45,494,075	\$39,037,373	86%

Table 4. 2015 Program Expenditures

Program Name	2015 Adopted Program Budget ¹¹	2015 Operating Program Budget	2015 Program Expenditures ¹⁶	Expenditures as % of Portfolio Operating Budget	% of Total Portfolio Expenditures
Single Family	\$4,473,249	\$6,692,951	\$5,629,763	29%	34%
Multifamily	\$6,476,600	\$9,948,600	\$9,003,227	46%	54%
Codes and Standards	\$1,274,500	\$1,747,282	\$1,529,695	8%	9%
Financing ¹⁵	\$965,145	\$1,061,792	\$585,967	3%	3%
Total Portfolio	\$13,189,494	\$19,450,625	\$16,748,652	86%	100%

Table 5. 2015 Program Expenditures by Cost Type

Program Name	2015 Program Expenditures	2015 Administrative Costs	2015 Marketing Costs	2015 Direct Implementation Costs	2015 Incentives Paid
Single Family	\$5,629,763	\$224,904	\$689,846	\$1,200,416	\$3,514,597 ¹⁷
Multifamily	\$9,003,227	\$248,366	\$146,339	\$2,974,523	\$5,634,000
Codes and Standards	\$1,529,695	\$169,146	\$100,527	\$1,260,022	\$0.00
Financing ¹⁵	\$585,967	\$92,871	\$236,382	\$256,715	\$0.00
Total Portfolio	\$16,748,652	\$735,287	\$1,173,093	\$5,691,676	\$9,148,597

¹¹ The Adopted Program Budget represents that budgets initially approved by the CPUC for each program year. The CPUC has not authorized an EM&V budget for BayREN. Thus, values reported here do not include budget or expenditures associated with EM&V.

¹² The Operating Program Budget includes funds shifted between programs, and additional funds approved during the year through the Advice Letter process.

¹³ Program Expenditures includes administrative costs, marketing costs, implementation costs and incentives paid for each year.

¹⁴ Single Family 2013-2015 Program Expenditures include incentives paid in the amount of \$49,400 from Flex Projects.

¹⁵ The Financing Program includes MF CAP, PAYS and Commercial PACE.

¹⁶ 2015 Program Expenditures reflects the expenditures (administrative costs, marketing costs, implementation costs and incentives paid) reported in the updated December 2015 Monthly Report, which was revised and submitted to the CPUC via the EE Stats website on 3/24/2016. These values reported here will not match previous values reported in 2015 quarterly or monthly reports due to some errors. Reference the final December 2015 monthly report.

¹⁷ Single Family 2015 Incentives paid accounts for amount invoiced for 2015 and may not align with actual payment date which is used for quarterly and monthly reporting.

VI. Cost Effectiveness

The Total Resource Cost Test (TRC) measures the net benefit of a program relative to the participant and administration costs. TRC Net Benefits (Net Rbn) subtracts Total TRC costs from Total Resource Benefits. Total Resource Net Benefit measures benefits by multiplying energy savings by avoided costs, and then reduced by the net-to-gross ratio. Total TRC costs in Table 6 are the sum of total administrative costs and incremental measure or participant cost.

The Program Administrator Cost Test (PAC) measures net benefits relative to total program costs (including incentive and administration costs). PAC Net Benefits subtracts Total PAC costs from Total Resource Benefits, Net (RBn). Total Resource Net Benefit measures total resource benefit by multiplying energy savings by avoided costs, then reducing by the net-to-gross ratio. Total PAC costs in Table 6 are the sum of total program administrative and incentive costs.

Table 6. 2015 Cost Effectiveness

PA	TRC Cost to Billpayers (TRC)	Total Savings to Billpayers (TRC)	Net Benefits to Billpayers (TRC)	TRC Ratio	Total Cost to Billpayers (PAC)	PAC Ratio	Levelized Cost TRC	Levelized Cost PAC
Single Family	\$7,506,008	\$1,991,102	-\$5,514,906	0.27	\$4,564,119	0.44	-1.18	-0.55
Multifamily	\$14,151,659	\$10,398,797	-\$3,752,862	0.73	\$7,406,289	1.40	-0.13	0.10
Portfolio Total	\$21,657,667	\$12,389,899	-\$9,267,768	0.57	\$11,970,408	1.04	-0.27	0.01

VII. Savings by End-Use

Only Single Family Home Upgrade and the BayREN Multifamily programs contributed to 2015 installed energy savings. Home Upgrade savings are calculated by the approved Phase 2 PEI EUCA Calculators (v3_20140602 & v4_20150127). Given the package nature of projects, each package has a mix of energy savings across HVAC, Water Heating, and Other—these have been combined under “Other” in Table 8.

Table 7. 2015 Annual Savings

Annual Results	2015 Annual Savings		
	Electric (kWh)	Demand (kW)	Gas (therm)
Single Family	0.68	0.96	0.14
Multifamily	3.76	0.32	0.25
Total Portfolio	4.44	1.28	0.39

Table 8. 2015 Annual Savings by End Use

End Use ¹⁸	GWH	% of Total	MW	% of Total	MMTh	% of Total
Residential	4.44	100%	1.28	100%	0.39	100%
HVAC	-	0%	-	0%	-	0%
Lighting	-	0%	-	0%	-	0%
Water Heating	-	0%	-	0%	-	0%
Other	4.44	100%	1.28	100%	0.39	100%
Nonresidential	-	0%	-	0%	-	0%
HVAC	-	0%	-	0%	-	0%
Lighting	-	0%	-	0%	-	0%
Other	-	0%	-	0%	-	0%
Low Income Energy Efficiency	-	0%	-	0%	-	0%
Codes & Standards Energy Savings	-	0%	-	0%	-	0%
Total Portfolio	4.44	100%	1.28	100%	0.39	100%

¹⁸Single Family Home Upgrade and Multifamily programs are custom comprehensive retrofit programs that install multiple projects simultaneously across a variety of end-uses. These have been combined under “other” in Table 8.

VIII. Commitments

Commitments provided in Table 9 were made in the past year with expected implementation by Dec 2016.

Table 9. Total Committed Funds

Program	Committed Funds ¹⁹	Expected Energy Savings		
		GWH	MW	MMTh
Single Family	\$798,325	0.15	0.22	0.14
Multifamily	\$499,500	0.22	0.03	0.03
Total Portfolio	1,297,825	0.37	0.25	0.17

¹⁹ Committed Funds represent the incentive dollar amounts in the pipeline at the end of 2015 per program reporting databases.

IX. Appendix A: BayREN Programs for 2015

CPUC ID	Program Name	Date Added	Date Removed
BayREN01	Single Family Home Upgrade	1/1/2013	N/A
BayREN02	Multifamily	1/1/2013	N/A
BayREN03	Codes and Standards	1/1/2013	N/A
BayREN04	Financing	1/1/2013	N/A
BayREN04-1	Multifamily Capital Advance	1/1/2013	N/A
BayREN04-2	Commercial PACE	1/1/2013	N/A
BayREN04-3	Pay As You Save (PAYS)	1/1/2013	N/A