

Bay Area communities working together for a sustainable energy future.

Bay Area Regional Energy Network

2016 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 can potentially scale and offer innovative avenues to energy savings.

The BayREN fills an important gap in the provision of energy efficiency services by providing a regional solution that better connects to local communities and conditions than is typically possible for a large utility. In addition, the BayREN provides services across jurisdictions that municipal only programs cannot achieve. The BayREN, by its public nature, is accountable to community needs and ensuring that all rate payers and citizens are included in services. The BayREN is led by local governments committed to greenhouse gas reductions and who use energy efficiency (EE) and integrated demand-side management (IDSM) as essential tools to achieve climate goals in alignment with local and state policy. The BayREN coordinates activities with a variety of related local government programs, such as housing renovation, water conservation, economic and job development and training so that program activities can serve multiple community needs. Coordination among the local governments through the BayREN allows the programs to benefit from economies of scale, increased capacity and focused administrative coordination with utilities and state government, as well as potential foundation support and available federal funding that can expand and enhance program services.

To date, the BayREN programs have provided over \$26 million dollars in incentives to Bay Area property owners, and savings of 10 million kWh and 1 million 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. BayREN programs saw continued success in 2016 as highlighted in this report.

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

- **Single Family Home Upgrade.** BayREN is the exclusive implementer of statewide Energy Upgrade California™, Home Upgrade Program in the nine Bay Area counties. As part of this program, BayREN developed the Home Upgrade Advisor, a phone based service that works with both contractors and home owners. The Advisor service has resulted in more robust uptake in the Home Upgrade program and more leads to the Advance Home Upgrade program. BayREN member agencies leverage their experience with residential programs to educate homeowners, recruit and train installation contractors, enhance participation in Home Upgrade.
- **Multifamily Upgrade.** This program offers no-cost technical assistance and a per-unit rebate for multiple measure energy upgrade scopes that save a minimum percentage of the whole building’s energy usage. The program engages property owners long-term, helping them plan upgrades over time.
- **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 no-interest capital for co-financing through existing multifamily lenders, lowering the cost of capital for property owners while maintaining a repaid pool of funds for future program cycles.
 - **Commercial PACE.** This program provides contractor channel outreach, education and ongoing

support services to enable contractors to fully integrate the compelling business case for C-PACE financing into their proposal and project development process. Moreover, the program provides advisory services to building owners considering energy efficiency improvements, including coordination with PACE capital providers to drive uptake of comprehensive energy efficiency projects that building owners are unable to self-fund.

- **The Water Bill Savings Program, formally known as Pay as You Save® (PAYS®).** This program offering is an innovative water-energy nexus pilot to provide technical assistance and program design 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 improvements. This program has influence in multiple markets, including renters and low-income housing, and offers customers a simple and attractive path to install energy- and water-saving technologies with no up-front cost.

II. 2016 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 is a statewide, prescriptive incentive program that eliminates the need for energy modeling and reduces the number of homeowner interactions 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.

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 the regional and local level. As trusted messengers within our local communities, each BayREN member agency is responsible for local marketing activities. While tactics vary from county to county depending on the specific needs of the jurisdiction, 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 is a major contributor 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 to the homeowner 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 and contractor-facing services that provide long term ongoing support and education to homeowners and contractors to help drive program participation and deeper energy savings. Although not all participants are interested in Home Upgrade, HUAs take a consultative approach to identify additional programs and/or services that support the homeowner's goals of becoming more efficient, including complementary program referrals to various energy and water efficiency programs in the Bay Area.

2016 Goals and Strategies

BayREN's comprehensive customer engagement, contractor support, and consistent program design yielded strong growth in 2016, helping the Program met or exceed all its goals. In 2016, BayREN turned its focus from start-up and

recruitment of new program contractors to the ongoing development of contractor businesses—particularly specialty contractors (with CSLB C-2 and C-20 only licenses). Training and networking opportunities were presented to the existing core of installation contractors to enhance technical knowledge and develop long-lasting industry partnerships.

Program Performance and Major Accomplishments

The Program yielded strong growth from 2015-2016, including:

- 60% increase in Home Upgrade incentive payments
- 59% increase in new Home Upgrade applications
- 15 Participating Contractors submitted their first project(s)
- 98 Participating Contractors submitted at least one project
- Average estimated energy savings per Home Upgrade was 452 kWh and 97 Therms
- BayREN paid a total of \$5,553,146 in incentives for 2,294 Home Upgrades and 604 Advanced Home Upgrade Assessments. On average, Home Upgrade projects cost \$14,775 and received \$2,344 in incentives.

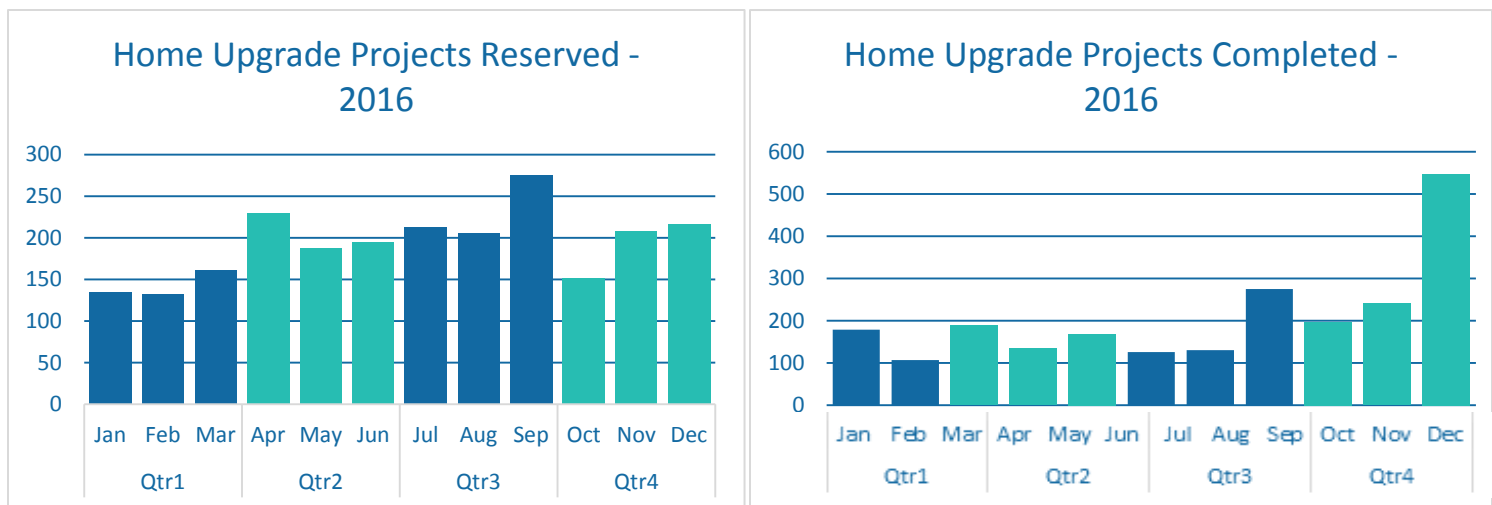


Figure 1. Home Upgrade Projects

- Home Upgrade Advisor Impacts:
 - 5,896 total accounts served and 4,806 referrals to complementary programs
 - HUA tracked 200 completed projects with a 55% program conversion rate. Illustrating the benefit of long-term engagement, 47% (or 92 of those completed projects were done by homeowners who originally engaged with a HUA in 2013 (1%), 2014 (8%), and 2015 (38%))
 - Homeowners that worked with a HUA who completed Home Upgrade and Advanced Home Upgrade projects realized on average 28% greater energy savings compared to projects completed without a HUA, reflecting a year-over-year increase of 5%
- Three two-day contractor trainings with 28 attendees from 25 different companies
- Continued offering the BayREN Learning Center – a free training resource for Participating Contractors
- Provided technical, business, and sales trainings for Participating Contractors, including:
 - Building Performance Institute (BPI) 1200 standards industry update (127 participants)
 - Home Performance sales training (14 participants)
 - Full-suite BPI Building Analyst training (10 participants)

- Organized and facilitated local marketing activities across the BayREN territory, including:
 - 31 homeowner workshops and 32 presentations with a combined attendance of 1,993
 - 59 tabling events and 20 canvassing days (door-to-door outreach) with a combined engagement over 4,000 residents
 - 87,730 targeted homeowners reached through direct mail
 - 421 real estate professionals engaged through 7 local events
 - 41 Local government and community based organization partnerships leveraged for outreach
- The program website (www.bayareaenergyupgrade.org) received over 75,000 web hits with an average of over 3 minutes spent on the site

Program Changes and Improvements for 2017

In effort to maintain consistency across Home Upgrade in the BayREN and PG&E territories, comply with Senate Bill 1414 and Title 24 changes, BayREN will make the following changes and improvements for 2017:

- Align with PG&E on air sealing measure requirements for homes built between 1993 and 2001, wall insulation requirements for 2x4 and 2x6 wall cavities, and air conditioner and heat pump minimum EER and SEER requirements.
- Require proof of permit closure for all projects containing an air conditioner and/or heat pump replacement, consistent with SB 1414 mandates.
- Increase the minimum requirements for the duct replacement measure to align with Title 24.

In addition, BayREN has identified the following strategies to improve the customer and Participating Contractor experience:

- Improve rebate and check processing turnaround time so that customers and/or contractors receive their incentive payment within 7-10 days of project approvals.
- Integration of an email engagement tool to improve customer and contractor communications and better identify customers who respond to program emails and visit BayREN website.
- Further integration with the Department of Energy (DOE) Home Energy Score that facilitates another entry point for homeowners, homebuyers, and home sellers to receive more information about the energy performance of their homes and motivates them to act.

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. Participant building types represent the diverse Bay Area multifamily market with respect to size, age, location, affordability, and ownership types.

2016 Goals and Strategies

- Incentivize 5,000 units worth of upgrades per year
- Provide technical assistance to develop a customized scope of work, and encourage properties to go beyond the status quo
- Offer a simple, flat incentive of \$750 per unit on multiple measures saving 15% or more of their whole building's energy usage, installing at least three "core" measures and one "non-core" measure
 - Core measures are defined as whole house measures which provide deeper savings such as Building Envelope (Windows, Insulation), Space Heating & Cooling (Furnace, Boilers, Heat Pumps, Duct Sealing & Insulation), and Appliances & Lighting (Refrigerators, In-unit Washing Machines and Lighting Fixtures)
- Provide referral assistance to other multifamily incentive programs in the Bay Area that are better suited
- Organize and facilitate outreach events and meeting across the BayREN territory

Program Performance and Major Accomplishments

The Program has maintained its popularity since inception in 2013, and has provided technical assistance to more than 66,000 units and over 20,000 units have been upgraded receiving more than \$15,000,000 in rebates. In 2016, the goals for completed projects were met and the target for technical assistance was exceeded. Major accomplishments for 2016 include:

- Provided technical assistance to more than 15,000 units
- Approximately 6,060 units' worth of incentives were reserved
 - 84 projects, representing 5,000 units, completed upgrades receiving \$3,750,000 in incentives
 - Average project size was 66 units and average estimated energy savings per project was 16%
 - Average estimated energy savings for completed project was 444 kWh and 33 Therms per unit

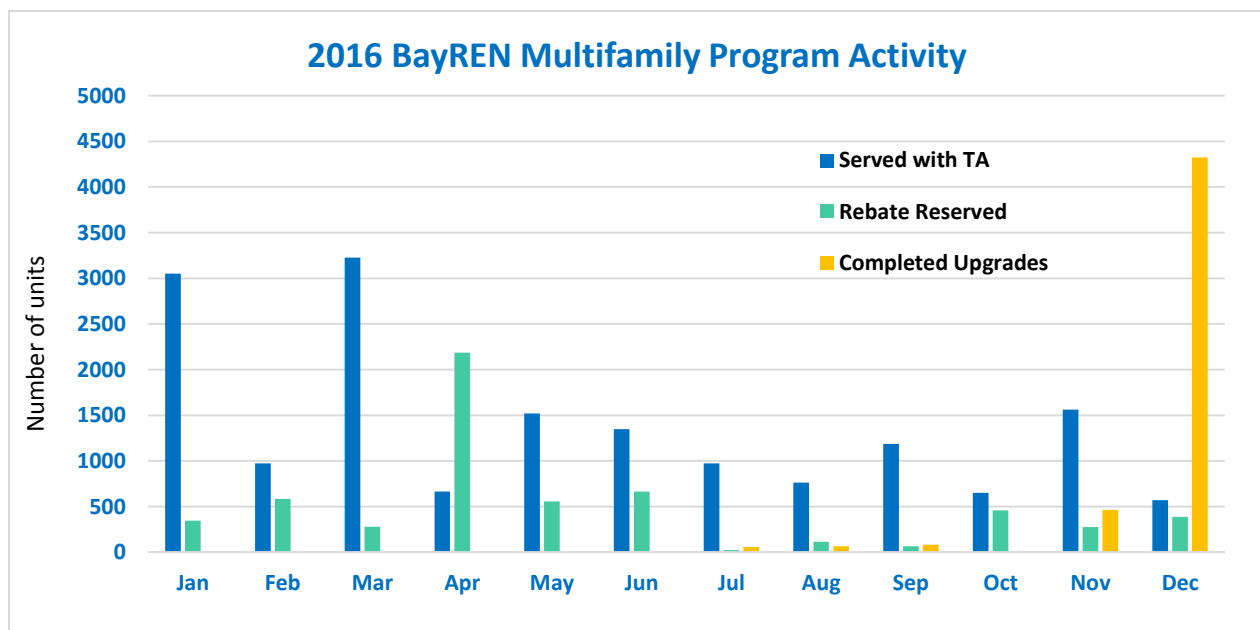


Figure 2. 2016 BAMBE Project Pipeline and Activity

- Referred over 3,722 units to other multifamily incentive programs in the Bay Area
- Outreach efforts included 8 Workshops and 3 Industry Events
 - A total of 86 building owners or property managers attended a workshop
 - 37 attendees completed a program interest form
- A total of 13 mailer campaigns were carried out throughout the region
- Program participants were recognized at 2 local government events
- The Program appeared in 5 publications (3 articles and 2 advertisements)

Program Changes and Improvements for 2017

The program has identified the following changes and improvements for 2017:

- Prepare for and establish the technical assistance infrastructure to incorporate utility usage data available through the new statewide benchmarking program mandated by Assembly Bill 802.
- Expand outreach with new tactics to reach additional multifamily property owner audiences.
- Implement Senate Bill 1414 proof of permit closure requirements for all projects containing an air conditioner and/or heat pump replacement.

C. Multifamily Capital Advance

The Multifamily Capital Advance Program (The Program or BAMCAP) 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 leverages lenders' existing infrastructure and procedures, and 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.

2016 Goals and Strategies

- Continue to close deals with participating lenders
- Assess the Program's ability to serve the diverse range of multifamily properties and identify any remaining gaps

Program Performance and Major Accomplishments

- Participated in 3 loans totaling \$327,521 of BayREN capital
- Projects served include a large owner-occupied HOA complex and two small non-profit affordable housing projects

Program Changes and Improvements for 2017

The Program has studied the types of projects served well by BAMCAP and identified ways to fill existing gaps such as working with lenders to create a product that serves smaller projects between refinancing event.

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 seeks to:

- Help individual jurisdictions in the Bay Area create and promote enforcement best practices 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, Bay Area Chapters of the International Code Council (ICC) meetings, and other opportunities to learn about resources related to energy efficiency policy and enhancement of code compliance.
- Evaluate energy code enforcement processes, identify enforcement barriers and challenges, and develop strategies to streamline energy code enforcement.
- Explore innovative program designs with the ability to scale and offer energy savings.

2016 Goals and Strategies

- Deliver 30 trainings
- Develop Residential HERS Registry curriculum
- Update training curriculum for 2016 Energy Code
- Improve the 2015 Regional Plan Check program by increasing the number of participating jurisdictions, expanding the types of projects supported, and aiding field inspectors
- Expand work with and evaluate the effectiveness of Electronic Compliance Improvement tools serving BayREN agencies
- Deliver four Regional Forums
- Offer Regional Forums and workshops via live and recorded webinars for on-demand access
- Continue collaboration with PG&E and Build It Green (BIG), who provide technical assistance on reach code local ordinance adoption
- Increase the number of Home Energy Score (HEScore) assessors to support services
- Work with the U.S. Department of Energy and the California Energy Commission to ensure HEScore supports both national and local policy objectives
- Help jurisdictions adopt Residential Energy Conservation Ordinance policies

Program Performance and Major Accomplishments

The BayREN Codes Program met or exceeded all 2016 goals; other major accomplishments include:

- Delivered 36 trainings to more than 500 attendees
- Organized and held 4 regional Forums with 425 participants
- Obtained ICC preferred provider status, which allows BayREN to grant attendees 0.1 ICC Continuing Education Unit (CEU) per hour of training
- Developed curriculum for a new course titled Zero Net Energy (ZNE) Introductory Training
- Developed three ICC credited online trainings for building departments and building professionals; training courses include:
 - Residential Forms and Permit Submittals for Additions with HERS Registry Training
 - Residential new Construction Compliance with HERS Registry Training
 - Residential Forms and Permits for Additions and New Construction Compliance
- Developed and demonstrated a web-based electronic permit (ePermit) guide focused on helping both permit applicants and permit technicians navigate water heater energy requirements and the permit application process

- Partnered with CodeCycle for a second demonstration effort to test the potential of online and tablet platforms programmed to deliver data-driven, building-specific compliance improvement
 - Between 2015 and 2016, CodeCycle reviewed 68 buildings, representing more than one million square feet of building space
- Delivered the “Zero Energy Buildings for Local Governments” forum in partnership with the New Building Institute (NBI)
- Established a BayREN Reach Code Policy Working Group to address local needs for policies and programs aimed at exceeding Energy Code, which established the following:
 - ZNE Technical Assistance for Municipal Buildings in five jurisdictions to provide necessary ground-work analysis to understand cost-effectiveness of ZNE in municipal building types and demonstrate ZNE ordinance feasibility.
 - Request for Proposal (RFP) and Owner’s Project Requirements (OPR) template language to assist local governments procure new Zero Net Energy (ZNE)-performing municipal and commercial buildings.
 - Regional expansion of an Outcome-Based Energy Reach Code and Zero Energy Performance Index (zEPI) toolkit to aid energy budget target setting, enable local outcome-based energy reach codes for new construction and use building energy benchmarking as a verification tool.
- Established a Residential Energy Assessment & Disclosure (READ) Working Group for jurisdictions exploring adoption of energy assessment ordinances to support and share best practices
 - Updated Residential Energy Policy White Paper in September 2016
 - Formed a time-of-remodel / rental inspection task force for jurisdictions pursuing alternatives to time-of-sale policy
- For the HEScore Program:
 - Enrolled 16 Assessors, increasing the number of qualified Assessors to 23
 - 353 homes received a HEScore in 6 Bay Area Counties
 - Issued 15 rebates, totaling \$2,650
 - 38 Assessments performed with a qualified HEScore Mentor onsite
 - Organized and held a two-day HEScore Boot Camp for raters, contractors, and home inspectors to become qualified Assessors
 - Coordinated with the Single Family and Home Upgrade Advisor to provide support to homeowners who received a Score

Program Changes and Improvements for 2017

The following changes and improvements for 2017 have been identified:

- Develop and deliver municipal ZNE project specific trainings to public works and architecture teams
- Greater collaboration with third-party organizations during the development of Regional Forums
- Expand the ePermit guide to other jurisdictions and increase the types of projects supported
- Facilitate coordination with Berkeley and their BESO implementation to refine READ program tools
- Solicit jurisdictions from San Mateo, Santa Clara, Contra Costa, Solano and Napa to participate in the Municipal ZNE Technical Assistance program

E. Commercial PACE

Program Description

The Commercial PACE (C-PACE) Financing Subprogram is designed to increase uptake in C-PACE financing available through a variety of Program Administrators (PA’s) and Capital Providers (CP’s) 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.

Briefly summarizing the 2015 kick-off activities, the C-PACE program consultant Sustainable Real Estate Solutions (SRS) delivered 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.

2016 Goals and Strategies

Throughout 2016, the BayREN C-PACE initiative built upon the initial 2015 kickoff activities, and worked directly with a cohort of contractors and energy service providers who attended the workshops and who brought forward project opportunities for development. In the first year, the team achieved many of its initial goals:

- 61 PACEcheck™ Pre-qualification Reports prepared by SRS for contractors
- 38 Project Finance Reports created by SRS in collaboration with contractors
- 20 active projects in progress, valued at over \$8,500,000
- 14 dormant projects, value at over 4,000,000
- 14 projects where SRS has solicited C-PACE financing term sheets from PA’s/CP’s

Program Performance and Major Accomplishments

After the strong start, SRS continued to provide direct assistance to commercial contractors through 2016-17 on multiple project opportunities, including project scenario development, attending owner meetings, validation of savings estimates, etc. In addition, BayREN hosted 3 contractor roundtables intended to collect additional field observations and feedback from the contractor community that would inform program adjustments or new initiatives.

- BayREN worked with SRS to plan and host three roundtables to provide a direct update on program initiatives and results to-date and gain additional feedback from the contractor community on gaps and needs.
 - Round-table dates:
 - November 8 in Oakland: 4 contractors attended, from primarily “middle market” HVAC service contract firms
 - November 9, 2017 in San Jose: 3 contractors attended
 - November 10, 2017 in San Francisco: 3 contractors attended
 - Key takeaways and observations:
 - Nearly all the contractors who attended were from primarily “middle market” HVAC service contract firms
 - All expressed strong support in the idea of expanding their offerings to current clients to include additional energy efficiency services, and are enthusiastic about BayREN’s Energy Efficiency Advisory service (discussed below) offerings
- Current project pipeline as of February 2017:
 - 23 projects in development valued at \$10.5 million value – all with SIR >1¹
 - 14 projects for which SRS has solicited financing term sheets from C-PACE capital providers
 - Presently forecasting a total of 6 projects to close in 2017 for a total of about \$6M in finance amounts

¹ Savings-to-Investment Ratio “SIR” > 1, where “S” = projected energy cost savings over ECMs effective useful life (EUL) & “I” = cost of equipment, installation and financing costs.

Program Changes and Improvements for 2017

Based on program learnings to-date, the BayREN C-PACE team proposes the following changes and improvements for 2017:

- Create a new BayREN-branded Energy Efficiency Advisory (EEA) service that is highly versed in C-PACE, and can provide guidance about multiple financing solutions. The EEA will present the project economic analysis to the owner in a professional, unbiased and compelling manner. The BayREN brand brings credibility to what can often be a challenging process.
 - The EEA will review multiple financing options (self-funding, utility on-bill financing, C-PACE financing, etc.) with the owner, to facilitate the confident selection of the “best-fit” financing solution for their project.
 - For C-PACE projects, the EEA will continue to assist the owner in obtaining mortgage holder consent (by request), and liaise with C-PACE PA’s and CP’s as needed.
- Introduce new tools and forms to streamline property qualification for C-PACE financing, reducing risks and uncertainties for contractors that are investing their valuable time and resources into the development process.
- Continue offering targeted ongoing contractor training and education, but generally shift resources to one-on-one contractor assistance.

Additional details of program improvements worth mentioning include:

- **Energy Efficiency Advisory Services:** The expanded EEA services will provide an opportunity for BayREN to be more impactful in the Bay Area marketplace and expand its brand awareness to the small and medium commercial sector, with a continued focus on assisting contractors and owners through the C-PACE financing process. SRS has already begun delivering this message and benefits to contractors with existing project opportunities, and have expanded outreach to the Bay Area contracting communities that have warmly received this EEA role. As is the case with many initiatives that require a mid-course correction, time and intensive efforts will be needed to fully-achieve the desired outcome and BayREN remains committed to its successful implementation.
- **Training and Education:** The introduction of BayREN’s EEA services will require outreach, training and support to targeted contractors. SRS’ past training and outreach efforts have created a sizable inventory of contractor prospects, and will be the focused target. Experience shows that classroom style training plays a vital role in creating initial awareness; however, full-scale engagement with targeted contractors is best achieved by direct one-on-one meetings and field support with building owner meetings. An outreach plan has been developed that will deploy human and technical resources to optimize these services. Tactics include classroom trainings, contractor roundtables, educational webinars, direct phone contact, in-person meetings and sustained one-on-one follow-up on a project-level basis. Having created a large inventory of Bay Area contractors who are now more familiar with the BayREN mission and support services, these existing relationships will allow for a comprehensive and speedy introduction of the EEA services. An existing pipeline of opportunities will provide direct access to projects that are more mature than early origination and will speed the deployment of the expanded services.

F. Water Bill Savings Program (WBSP)

Program Description

The BayREN Water Bill Savings Program, formally known as the PAYS® Program, is working to support Partner Municipal Water Utilities (Town of Windsor, City of Hayward, and East Bay Municipal Utility District) design and 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 2017.

BayREN WBSP is based upon the Better Buildings Program (Department of Energy) 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 WBSP Partner Utility Programs are designed to scale and replicate the work from Windsor, and facilitate similar rapid project uptake. BayREN WBSP 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 (or other on-bill) Programs. Components include:

- A self-sustaining resource efficiency program in which participating customers pay for installed improvements and program operation through a regular surcharge (efficiency charge) attached to their meter.
- Unique customer protections that drive program participation, including the assurance that the customer's utility bill savings from installed improvements will exceed their efficiency charge.
- Selection of Partner Utilities (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 improvements that would generate sufficient water, gas, and electricity savings
- Customized technical assistance to address the diverse and complex needs of municipal water utilities and their customers.

2016 Goals and Strategies

The BayREN Water Bill Savings Program ramped up efforts in program design, redesign, and implementation in 2016. Programs in East Bay Municipal Utility District and the City of Hayward began project installations, while the Town of Windsor worked through program redesign for relaunch in 2017. 2016 goals included:

- 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.
 - Support for multi-family residential services, including on contract agreement finalization and launch and implementation of the pilot program.
- Technical assistance for City of Hayward's Green Hayward PAYS® Program for multifamily residential services, including indoor plumbing fixtures, common area energy improvements that deliver savings to the property owner (lighting, hot water distribution, etc.), and weather-based irrigation controller installation.
- 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.
- 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.
- Increase marketing support for Partner Utility Programs.

Program Performance and Major Accomplishments

Building on the previous year's work, the Water Bill Savings Program:

- Began serving multi-family customers through the East Bay Municipal Utility District's Water Smart On-Bill Program in 2016. The program has begun installing water efficiency measures throughout the territory and provided rebate incentives to qualifying customers.
- In the City of Hayward, Green Hayward PAYS® Program, saw 138 projects completed with a net savings over \$18,000 per billing cycle. In addition, support of marketing and outreach services to potential multi-family eligible customers continued throughout the year.
- The Town of Windsor's Windsor Efficiency PAYS® Program was supported for single-family program redesign, including contractor outreach and contract agreement updates.
- Windsor Efficiency PAYS® and Green Hayward PAYS® Project Data:
 - Total value of installed projects: \$717,799
 - Single family: \$335,292; multifamily: \$255,572; time-share: \$126,935
 - Total value of rebates accessed for projects: \$144,537
 - \$140,069 in Water Utility rebates; \$4,468 in PG&E rebates
 - Total project costs eligible for surcharge: \$573,262 (installed value - rebates)
 - Single family: \$216,398; multifamily: \$229,929; time-share: \$126,935
- Windsor Efficiency PAYS® and Green Hayward PAYS® Repayment History:
 - Unpaid surcharge sent to collection: \$1,284.49
 - Unpaid surcharge written off for customer service reasons: \$1,816.78 (0.3% of total project costs placed on surcharge)
 - Partial payments of surcharge: 0
 - Transfers of surcharge: 16 Single Family accounts (sale of participating property, with surcharge for project transferring to successor customer at that project location)

Program Changes and Improvements for 2017

Program updates for our partner utilities will be an ongoing effort in 2017. Support of our current partner's will facilitate the following:

- Continue technical, and marketing and outreach assistance for our current partner utilities (East Bay Municipal Utility District, City of Hayward, and the Town of Windsor)
- Create Savings Analysis Reports based on completed projects to inform program updates and redesign
- Continue development of a regional model for the program advancement and engagement with new partner utilities and other local partners
- Research and outreach to engage a more diverse contractor base to support partner utility programs
- Increase marketing support for partner utility programs

III. Energy Savings

In 2016, 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 on 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)	Lifecycle Energy Savings (GWh)	Annual Natural Gas Savings (MMth)	Lifecycle Natural Gas Savings (MMth)	Peak Demand Savings (MW)
Single Family Savings					
2016 SF Savings	0.93	8.93	0.20	3.08	1.32
Multifamily Savings					
2016 MF Savings	1.98	31.15	0.17	2.90	0.22
Total Portfolio					
2016 Portfolio Savings	2.92	40.08	0.37	5.98	1.54
CPUC Goal Adopted²	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 CPUC Goals 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)^{3,4}

Annual Results 2016	Annual CO2	Lifecycle CO2	Annual NOx	Lifecycle NOx	Annual SOx	Lifecycle SOx	Annual PM10	Lifecycle PM10
Single Family	1,259	23,023	73	1,324	0	0	36	644
Multifamily	2,073	33,565	270	4,239	0	0	138	2,168
Total Portfolio	3,332	56,588	343	5,563	0	0	174	2,812

V. Expenditures

Table 3. 2016 Program Expenditures

Program Name	2016 Adopted Program Budget	2016 Operating Program Budget	2016 Program Expenditures	Expenditures as % of Portfolio Operating Budget	% of Total Portfolio Expenditures
Single Family	\$8,173,249	\$8,513,527	\$8,068,507	45%	47%
Multifamily	\$6,476,600	\$6,505,510	\$6,385,335	35%	38%
Codes and Standards	\$1,274,500	\$1,519,544	\$1,492,500	8%	9%
FinancingError! Bookmark not defined.	\$1,059,526	\$1,459,940	\$959,731	5%	6%
Total Portfolio	\$16,983,875	\$17,998,521	\$16,906,073	93%	100%

Table 4. 2016 Program Expenditures by Cost Type

Program Name	2016 Program Expenditures	2016 Administrative Costs	2016 Marketing Costs	2016 Direct Implementation Costs	2016 Incentives Paid
Single Family ⁵	\$8,068,507	\$277,068	\$837,981	\$1,400,312	\$5,553,147
Multifamily	\$6,385,335	\$318,850	\$163,278	\$2,153,206	\$3,750,000
Codes and Standards	\$1,492,500	\$176,896	\$249,736	\$1,065,868	\$0
Financing	\$959,731	\$137,837	\$139,738	\$682,156	\$0
Total Portfolio	\$16,906,073	\$ 910,651	\$1,390,734	\$5,301,542	\$9,303,147

³ Environmental Impacts are Gross Annual and Lifecycle Tons of Avoided Emissions.

⁴ Avoided SOx reductions are not calculated in the CET calculator.

⁵ Two Single Family projects received an initial rebate in 2015 but were underpaid. A secondary payment was issued in February of 2016 to make up the difference, which was approximately \$450.00. Those two projects were claimed in 2015.

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 5 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 5 are the sum of total program administrative and incentive costs.

Table 5. 2016 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	\$14,285,564	\$3,881,920	-\$10,403,644	0.27	\$7,896,164	0.49	1.09	0.60
Multifamily ⁶	\$14,207,222	\$7,651,990	-\$6,555,233	0.54	\$5,994,081	1.28	0.67	0.28
Codes and Standards	\$1,492,500	\$0	-\$1,492,500	0.00	\$1,492,500	0.00	0.00	0.00
Financing	\$959,731	\$0	-\$959,731	0.00	\$959,731	0.00	0.00	0.00
Portfolio Total	\$30,945,018	\$11,533,910	-\$19,411,108	0.37	\$16,342,476	0.71	0.93	0.49

⁶ The cost effectiveness calculation inputs are consistent with the methodology used in BayREN's previous program cycle filings, apart from using a measure-weighted EUL as recommended by the EM&V reports on the REN Impact Assessment and the statewide Multifamily Impact Evaluation. We acknowledge recommendations to use dual baseline savings and a revised Net-to-Gross value based on survey research. We will participate in the baseline working group and will consider updating our methodology once issues are resolved. EM&V is continuing NTG survey research through 2016 on 2015 projects and we will consider applying the updated NTG value that results from that process.

VII. Savings by End-Use

Only Single Family Home Upgrade and the BayREN Multifamily programs contributed to 2016 installed energy savings. Home Upgrade savings are calculated by the approved Phase 2 PEI EUCAL Calculators (v3_20140602 & v4_20160127). 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 7.

Table 6. 2016 Gross Annual Savings

Annual Results	2016 Annual Savings		
	Electric (GWh)	Demand (MW)	Gas (MMTh)
Single Family	0.93	1.32	0.20
Multifamily	1.98	0.22	0.17
Total Portfolio	2.92	1.54	0.37

Table 7. 2016 Gross Annual Savings by End Use

End Use ⁷	GWh	% of Total	MW	% of Total	MMTh	% of Total
Residential	2.92	100%	1.54	100%	0.37	100%
HVAC	-	0%	-	0%	-	0%
Lighting	-	0%	-	0%	-	0%
Water Heating	-	0%	-	0%	-	0%
Other	2.92	100%	1.54	100%	0.37	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	2.92	100%	1.54	100%	0.37	100%

⁷Single 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 7.

VIII. Commitments

Commitments provided in Table 8 were made in the past year with expected implementation by Dec 2017.

Table 8. Total Committed Funds

Program	Committed Funds ⁸	Expected Energy Savings		
		GWh	MW	MMth
Single Family	\$471,800	0.1315	0.18717	0.0285
Multifamily	\$20,250	0.0136	0.00108	0.0024
Total Portfolio	\$755,700	0.145	0.188	0.031

⁸ Committed Funds represent the incentive dollar amounts in the pipeline at the end of 2016 per program reporting databases.

IX.Appendix A: BayREN Programs for 2016

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	Water Bill Savings Program (WBSP)	1/1/2013	N/A