

Bay Area Regional Energy Network 2018 Energy Efficiency Annual Report



April 15, 2019

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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), BayREN is a program administrator (PA) that implements effective energy saving programs on a regional level and draws on the expertise, experience, and proven record of Bay Area local governments to develop and administer successful energy efficiency, climate, resource, and sustainability programs.

BayREN is funded by California utility ratepayers under the auspices of the California Public Utilities Commission (CPUC), as well as through grants and funding from member agencies, other state and federal agencies, and foundations. One of three Regional Energy Networks in the state, BayREN represents 20% of the state's population.

Since its inception, BayREN has been addressing the three areas indicated by CPUC Decision 12-11-015 in the formation 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.

BayREN funding for 2018 was approved in D.16-08-019:

"[E]xisting approved activities [of the RENs] may have ongoing funding that was previously approved."¹ Thereafter, in D.18-05-041, BayREN's Business Plan and Budgets² for the term of the Rolling Portfolio were approved with slight modifications.

BayREN did not make any changes to its 2018 programs or activities after the approval of the Business Plan but will begin to implement changes in 2019.

BayREN's services complement and supplement IOU programs,

¹ D.16-08-019 at page 10.

² <https://www.bayren.org/news/bayren-business-plan>

Achievements since 2013:

- 237 Billion BTUs Energy Saved.
- 8.6 Million Tons of Carbon Avoided.
- 39,000 Housing Units Upgraded.
- \$40.4 million in Incentives Awarded.

Resource Programs exceeded 2018 goals:

- Provided Technical Assistance to property owners of over 19,000 multifamily housing units.
- Upgraded over 5,309 multifamily units, awarding \$3.9M in incentives.
- Served over 7,500 single family customers and made over 10,000 program referrals.
- Enabled over 2,000 Home Upgrade and Advanced Home Upgrade projects, awarding \$3.4M in incentives.

Non-Resource Programs achieved outstanding results:

- More than half of the jurisdictions in the Bay Area (55) participated in one or more of BayREN's Codes and Standards activities in 2018.
- 3,000 residents have undergone an energy rating with Home Energy Score.
- Under the WBSP, Partner Utilities have installed 247 single family and 480 multifamily unit PAYS® projects.
- Provided high-quality technical assistance to a wide range of commercial building owners. This service directly supported project implementation while expanding mechanical contractor knowledge and understanding of energy efficiency incentives and financing.

fill gaps, and identify synergies among approaches to maximize opportunities for customers and other market actors. For example, BayREN provides a regional solution that better connects to local communities and conditions than is typically possible from a large utility. In addition, BayREN provides services across jurisdictions that municipal-only programs cannot achieve.

BayREN's governance is through the "Coordinating Circle," which includes representation from ABAG and all nine Bay Area counties. Each BayREN member agency designates a voting member to the Coordinating Circle. This body makes decisions regarding overall policy, high-level programmatic issues, and budgets.

To date, BayREN programs have **provided \$40.4 million in incentives to Bay Area residents, saved 237 Billion BTUs of Energy and avoided 8.6 Million Tons of Carbon Emissions.** BayREN has enhanced the typical incentive program model with customer-focused technical assistance, innovative financing, marketing and outreach, and capacity building services that improve the uptake, satisfaction, and effectiveness of the incentives. BayREN programs saw continued success in 2018 as highlighted in this report. BayREN offers services in the following four key program areas:

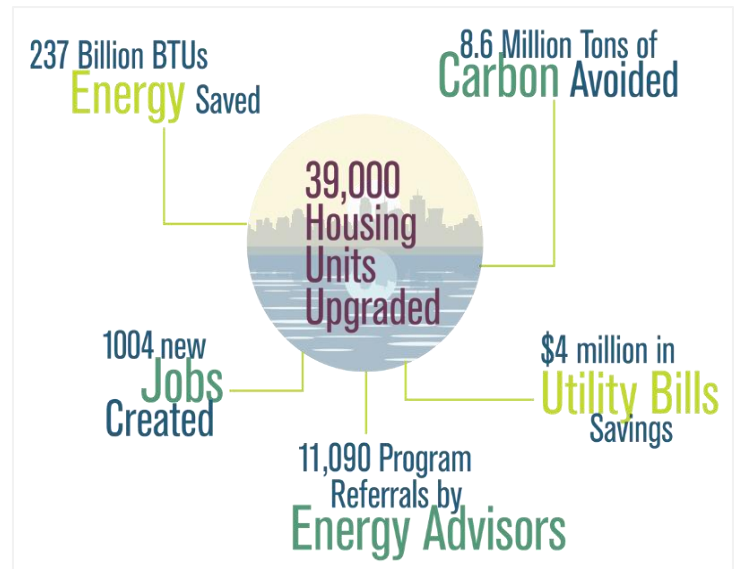


Figure 1: BayREN Accomplishments

- Single Family Home Upgrade.** BayREN implements the Energy Upgrade California® Home Upgrade Program (HUP) within the nine Bay Area Counties. BayREN provides cash rebates to Bay Area single family homeowners to undertake energy efficiency upgrades through program participating contractors. BayREN also manages the no-cost Energy Advisor service, which assists customers during their home energy improvements by providing unbiased advice on participating contractors and project installation. The Energy Advisor also refers customers to other complementary programs they may be eligible for and provides support to participating contractors regarding project scope, business development, and the program. Apart from rebates, the Energy Advisor service continues to be our customers' most valued BayREN offering.
- 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. Unlike the IOU programs that require the participant to hire a rater, this program engages property owners who are sensitive to the barriers of participating in a rebate program and helps them plan and undertake upgrades over extended periods.

- **Codes and Standards.** The mission of BayREN's Codes and Standards program is to provide support for and between Bay Area local governments to increase energy performance of buildings by improving energy code compliance, increasing adoption of local energy policies, and ensuring that local government needs, and concerns are considered when state policies are developed.
- **Financing:**
 - **Multifamily Capital Advance.** BayREN enables deep energy upgrades by offering no-interest capital for co-financing through multifamily lenders, lowering the cost of capital for property owners while maintaining a repaid pool of funds for future program cycles. The program also has a Lender Referral Service, which matches upgrade projects with existing financing products.
 - **Commercial PACE.** C-PACE program provides 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. The program also provides personalized advisory services to building owners considering energy efficiency improvements, including coordination with PACE capital providers to drive 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 is an innovative water-energy nexus program that provides technical and program design 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 improvements. In 2018, the program initiated development of a regional service that will centralize funding and administration and open participation to water utilities throughout the Bay Area. 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.

2018 Energy Efficiency Programs Overview

Single Family Home Upgrade Program

Program Description

BayREN is the exclusive implementer of the Energy Upgrade California® Home Upgrade Program within the nine Bay Area counties. The Home Upgrade Program provides a menu of prescriptive energy efficiency improvements for homeowners to choose from. These improvements include building air sealing, duct sealing, high-efficiency appliances (furnaces, air conditioners, hot water heaters), energy-efficient windows, and insulation (attic, wall, floor and/or ducts). The homeowner must complete at least three prescribed improvements to be eligible for rebates. Providing customers with a prescriptive list eliminates the need for energy modeling and reduces the number of homeowner interactions, thereby simplifying the approach to a whole house energy efficiency upgrade. Home Upgrade's simple design is intended to produce a high volume of energy efficiency upgrades and energy savings while maintaining a reasonable level of technical rigor and quality assurance.

Projects must be completed by a Home Upgrade Participating Contractor who has completed the rigorous program training. Contractors (and their work) are thoroughly vetted to ensure the upgrades are performed to the highest standard and customers receive the most savings from the project. BayREN recognizes that these Participating Contractors are an important outreach arm of the program and provides each one with a personal Account Manager, who assists with any programmatic questions (e.g., paperwork, eligibility), training needs, and guidance on business best practices. The contractor services team has also provided one-on-one trainings to interested contractors. This personalized service has helped our pool of participating contractors market the HUP benefits and sell more projects to our customers.

2018 Single Family Goals

- Provide comprehensive customer engagement, contractor support, and consistent program design.
- Provide individualized and tailored contractor trainings and networking opportunities.
- Offer services that provide long-term support and education to help drive program participation and deeper energy savings.
- Implement a multi-tiered Marketing, Education, and Outreach campaign on both the regional and local level.
- Engage communities through homeowner workshops, presentations and tabling at community groups, door-to-door canvassing and local media buys/direct mail.
- Offer a \$300 Assessment Incentive to encourage participation in the Advanced Home Upgrade Program.
- Require proof of permit closure to align with SB1414 mandates.
- Offer rebates for smart thermostats to improve comfort and energy savings for the customer.
- Increase the number of Home Energy Scores (HEScore) across the Bay Area and offer green real estate trainings.

In addition to the energy efficiency improvements, BayREN’s Home Upgrade Program also provides many “non-resource” benefits outlined below.

Multi-tiered Marketing, Education, and Outreach Campaign

The Home Upgrade Program is supported by a Marketing, Education, and Outreach (ME&O) campaign that is implemented across the region through local efforts by the BayREN members agencies. The BayREN members have multiple interactions with both local customers and contractors, which have proven to be a successful outreach strategy for the program. The local member agencies are best connected with the customers in their jurisdictions and understand the unique needs of their communities. Further, local governments are viewed as trusted messengers. The ME&O activities vary by county, but primarily include a mix of homeowner workshops, presentations to community groups, tabling at community events, door-to-door canvassing, local media buys, direct mail, and social and digital media campaigns. Each county organizes at least one homeowner workshop where they also engage with their local Participating Contractors and are available to answer customers’ questions related to home upgrades. As an Energy Upgrade California® program implementer, BayREN works closely with the Statewide ME&O administrator to coordinate marketing efforts, as appropriate.

Advanced Home Upgrade Assessment Incentive

BayREN also helps promote PG&E’s Advanced Home Upgrade Program (AHUP) by providing a \$300 Assessment Incentive to the homeowner to help offset the cost of the required comprehensive energy assessment. This added incentive reduces the barrier-to-entry for customers interested in this program. BayREN’s Energy Advisors also refer many customers to the AHUP when they determine that AHUP best meets a customer’s needs.

Home Energy Score

The Regional Home Energy Score (HEScore) Program is a low-cost asset-rating initiative that engages contractors, home inspectors, and raters to offer Home Energy Scores in the Bay Area. The Program provides training and mentoring for qualified Assessors, marketing and outreach campaigns, and the creation of a customized energy efficiency recommendations report that aligns with the Home Upgrade Program. Along with the Score and a customized report, the Single Family Program provides homeowners with associated energy and cost savings estimates, and referrals to energy efficiency programs, incentives, and financing tools. HEScore also supports the implementation of local policy initiatives like the City of Berkeley’s Energy Saving Ordinance (BESO) and the City of Albany’s HEScore pilot program. There was a significant increase in both the number of Assessors trained on HEScore and in the number of homes that received a Score in 2018. The Program also began to offer green real estate trainings and courses to professionals.

Energy Advisor Service

The Energy Advisor offers both consumer- and contractor-facing services for ongoing support and education to help drive program participation and deeper energy savings. Not all participants are interested in Home Upgrade; therefore, the Advisors 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. Referrals are made to programs offered by PG&E, MCE, Energy Watch partnerships, and others.

Program Performance and Major Accomplishments

The program maintained consistent performance in 2018. Accomplishments include:

- 1,643 single family homes were upgraded with energy efficiency improvements that translate to total energy savings of 503,228 kWh and 162,693 therms.
- \$3,722,350 in incentives were paid to customers through the Home Upgrade Program and \$119,550 for the Advanced Home Upgrade assessment incentives.
- The average incentive per customer was \$2,264, with average savings of 340 kWh and 109 therms, an approximate savings of 14.2% per home. The average project cost incurred by the customer was \$16,025.

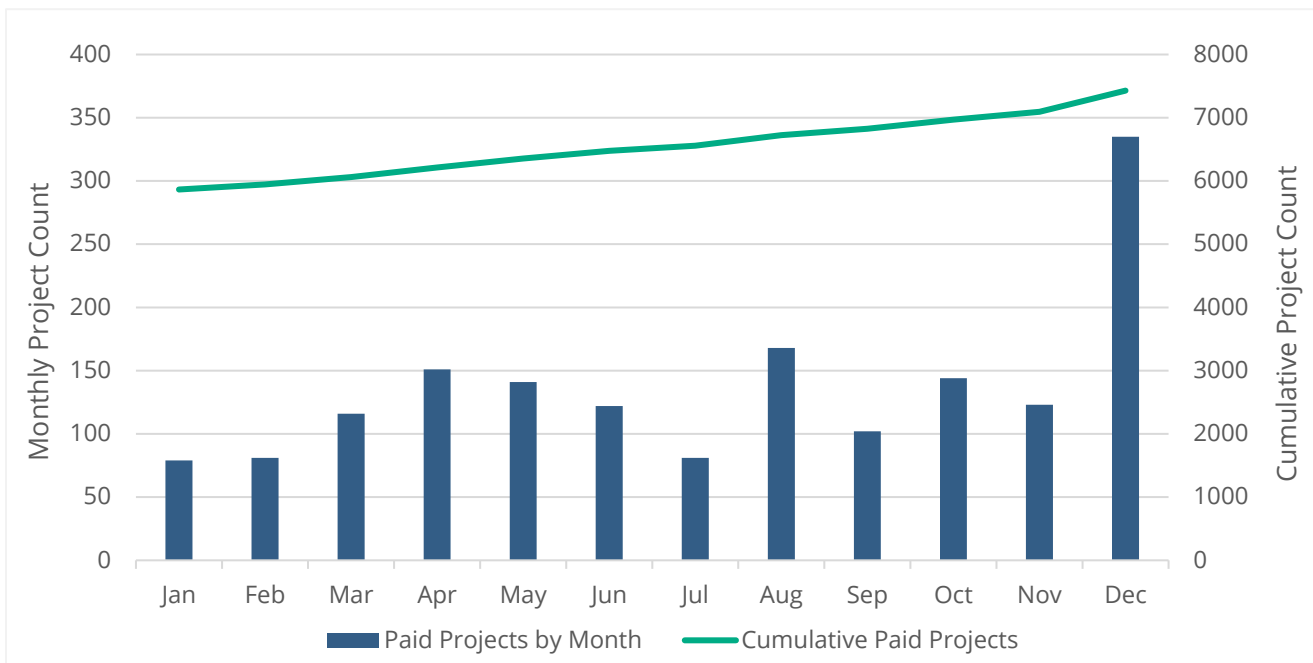


Figure 2: 2018 Home Upgrade Project Activity

- A smart thermostat rebate of \$150 was introduced in May 2018, and 176 smart thermostats were installed within the eight-month period to year end.

- Through the Home Upgrade program, incentives were received by homes located in 188 unique zip codes. This translates to a 43% region-wide coverage for the program.
- A total of 120 contractors were enrolled as participating contractors into program in 2018, along with 16 participating raters.

The Energy Advisor accomplishments include serving 1,323 customers:

- 767 complementary program referrals were made to 39 different programs.
- 68.6% of customers who contacted the Energy Advisor went forward with a project with the advisor's assistance. This conversion rate was considerably higher than 2017, with a reported conversion rate of 57%. The lifetime conversion rate for the Energy Advisor service was reported at 60.4%.
- 570 participating contractor support cases were completed.
- 63 referrals were made from "Friends and Family", bringing the total lifetime referrals from the group to 453.

Local ME&O activities organized within the BayREN territory include:

- 26 Homeowner workshops and 34 presentations to community groups and employers were organized by the BayREN county members throughout the region to promote the Home Upgrade program and participating contractors.
- 48 different tabling events were also organized by the county representatives, which led to over 25,000 impressions and 2,600 direct impressions.
- County members also carried out 20 direct mail campaigns promoting the Home Upgrade program and other relevant events.
- The program website www.bayareaenergyupgrade.org, had more than 32,000 users, of which 84% were new users.

HEScore and real estate training accomplishments include:

- Successfully enrolled 19 Assessors, with 55 active Assessors in 2018.³
- 3,197 Scores were performed across all 9 counties, including 359 BESO Scores.
- Provided 2,779 rebates, totaling \$693,950 in incentives.

³ The number of active Assessors fluctuates throughout the program year. Assessors must Score a home every 180 days to stay active, per DOE requirements. Deactivated Assessors can request to be reactivated by taking a refresher training course and Scoring a home.

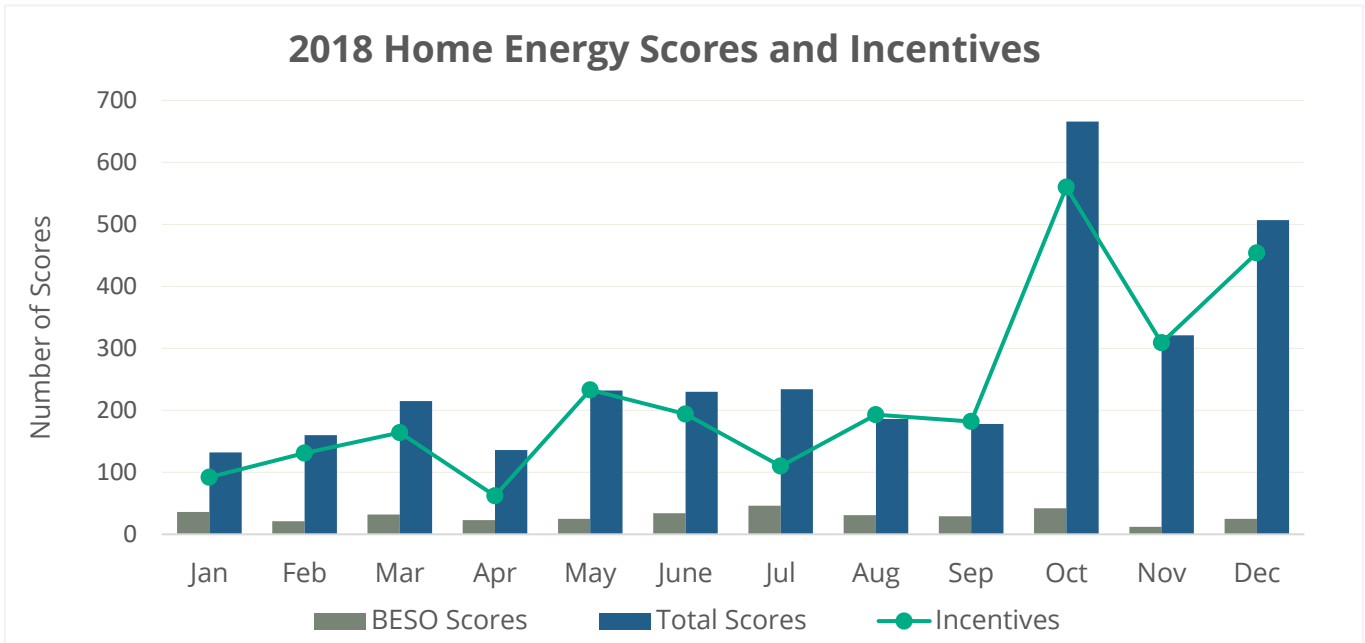


Figure 3: Home Energy Scores and Incentives

- Performed 29 on-site mentoring and in-field quality assurance shadow sessions with 9 Assessors.
- Launched the HEScore tracking database that generates a custom recommendations report with the home’s estimated annual energy costs and carbon footprint.
- Coordinated with the Energy Advisor to provide support to homeowners who received a Score below 6.
- Provided four National Association of Realtors (NAR) Green Designation Trainings to 70 professionals.
- Led two Certified Green Real Estate Professional (CGREP) courses and certified 24 professionals.
- Provided two Certified Green Lender Professional (CGLP) Trainings to 18 professionals.
- Provided two Accredited Green Appraiser (AGA) Trainings to 30 professionals.

Opportunities in 2019 and Beyond

As described in BayREN’s Energy Efficiency Business Plan, approved in May 2018, BayREN will transition out of the Home Upgrade Program and implement strategic changes that will allow BayREN to better serve communities that have historically had lower participation in energy efficiency programs. One of the key barriers of participation for the Home Upgrade program is the high upfront capital required by the customer to complete a project. This is an even higher barrier for moderate income⁴ households that

⁴ Defined by BayREN as households with annual income of \$48,000 – \$125,000.

are also not eligible for income-qualified programs offered in the region. The new program design will carry out targeted marketing to this moderate-income population and offer solutions that will help them be more energy efficient.

BayREN will modify the program requirements to facilitate helping our customers at whatever stage they are on in their energy efficiency journey and provide solutions that would allow customers to achieve whole home efficiency at the end of the six-year program cycle.

One key strategy that will be implemented is offering single measure rebates to customers, rather than the current bundled offerings. This will allow more flexibility for the customer to choose the upgrades that best meet their current needs, based on availability of resources. Customers will be encouraged to share their energy usage data, which will then be analyzed by the Energy Advising team to develop an energy efficiency plan. The plan will prioritize the recommended upgrades, and the Energy Advisor will work with the customer and participating contractors to achieve maximum savings.

A key barrier to participation for contractors is the high administrative costs associated with Home Upgrade. In 2019, we will introduce a new contractor portal aimed at streamlining the application process thereby reducing the contractor's administrative burden. We will strive to attract more contractors to the program and thus give customers a wider pool to select from.

In 2019, BayREN will launch the Green Labeling program, which will build upon and expand our impact in the single family sector. We will continue to offer HEScore but will expand our reach by providing opportunities for realtors, appraisers, and lenders to increase their ability to understand, market, and evaluate energy efficient and green homes. The primary objective of this expanded effort is to increase awareness and information transparency through green labeling, while also increasing savings in the single family and eventually the multifamily programs. Additionally, the incentive provided for a HEScore will be reduced to \$200 per eligible customer, and outreach will be more focused on increasing the number of Scores in underserved counties.

Bay Area Multifamily Building Enhancement Program (BAMBE)

Program Description

BayREN offers the Bay Area Multifamily Building Enhancements Program (BAMBE) throughout the nine-county Bay Area. BAMBE fills an existing program gap by providing a streamlined participation path for multiple upgrades in multifamily buildings. The program design allows for deeper and more customized savings than direct install programs but does not require the up-front cost of an energy assessment associated with a whole-building performance program. The overwhelmingly positive response from multifamily building owners to BAMBE shows that the program succeeds in filling this gap and continues to tap into the previously elusive savings potential. The streamlined and customized technical assistance model and multiple-measure incentive motivates property owners to take a holistic approach to energy efficiency planning. BayREN continues to refine BAMBE to encourage greater energy savings while continuing to appeal to a broad spectrum of multifamily property owners and operators. Participant building types represent the diverse Bay Area multifamily market with respect to size, age, location, affordability, and ownership types.

Program Performance and Major Accomplishments

BAMBE has maintained its popularity since inception in 2013. **To date, technical assistance has been provided to more than 100,000 units; approximately 31,400 units (totaling 458 projects) have been upgraded, and more than \$47.1 million in rebates have been paid to property owners.** In 2018, the goals for completed projects and technical assistance were exceeded. The BAMBE design is an effective model for achieving multiple-measure upgrades in every segment of this hard-to-reach sector, and completed projects are representative of the diverse Bay Area housing stock. Major accomplishments in 2018 include:

- Technical assistance provided to more than 19,000 units.
- Incentives reserved for approximately 6,000 units.
- 75 projects, representing 5,309 units, completed upgrades receiving \$3,981,175 in incentives.
- Average project size was 71 units and average estimated energy savings per project was 16%.

2018 Multifamily Goals

- Incentivize 5,309 dwelling-units.
- Provide technical assistance to develop a customized scope of work and encourage property owners to install whole house measures that go beyond the status quo.
- Offer a simple, flat incentive of \$750 per unit when saving 15% or more of the whole building's energy usage.
- Provide referrals to other multifamily incentive programs in the Bay Area that are better suited.
- Organize and facilitate outreach events and meetings across BayREN territory.

- Average estimated energy savings for completed projects was 457 kWh and 34 Therms per unit.
- Over 1,000 units were referred to other multifamily programs in the Bay Area.

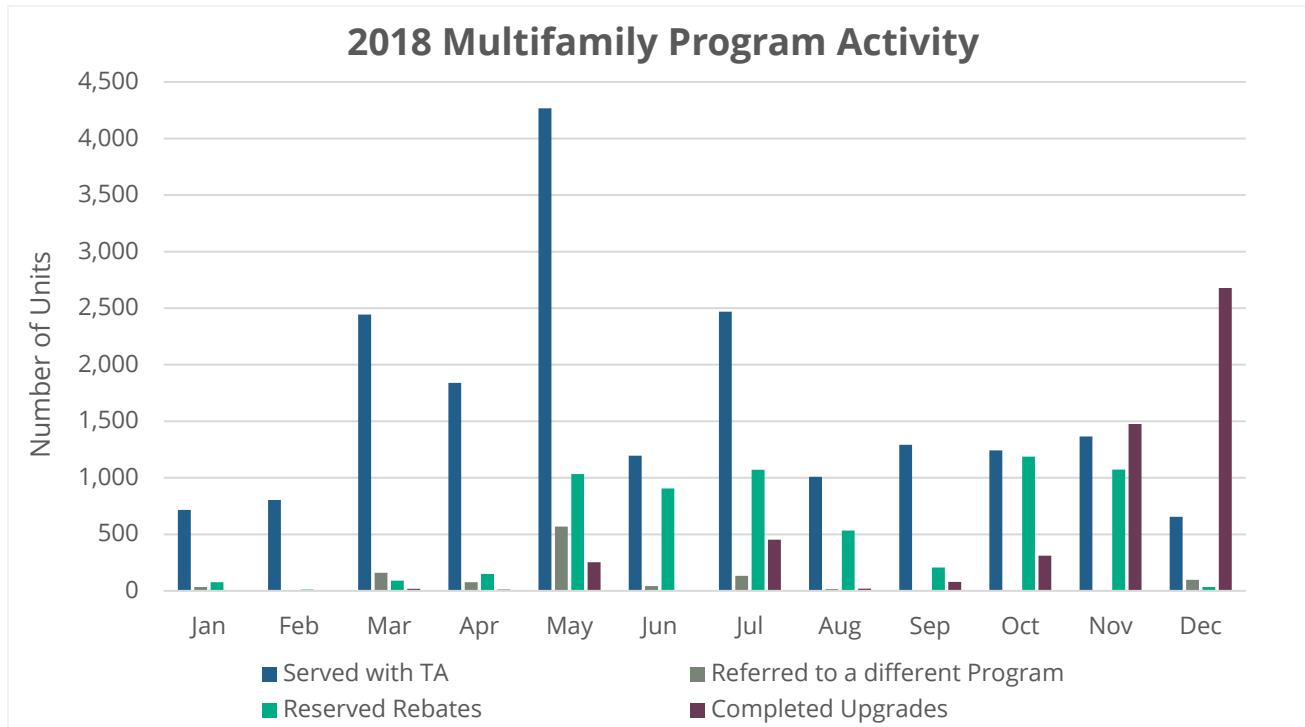


Figure 4: 2018 Multifamily Program Activity

- Outreach efforts include 11 Workshops and 4 Industry Events:
 - 215 building owners or property managers attended a workshop.
 - 88 attendees completed a program interest form.
- 9 mailer campaigns were conducted throughout the region.
- Program participants were recognized at 1 local government event in San Mateo County for being energy champions.

Opportunities in 2019 and Beyond

As detailed in the Business Plan, BayREN plans to continue BAMBE in the short- to mid-term until a substantial portion of the multifamily market has been reached. From the more than 450 properties that have participated in BAMBE, we have gained valuable insight into how to evolve the program to intensify the role that the multifamily market plays in helping California meet its energy goals. In 2019, BayREN is teaming with PG&E and MCE to further align the multifamily programs. This alignment is intended to reduce confusion in the market and help ensure that property owners are getting the type of service and incentive level most appropriate for their business model, and thus expand the volume and quality of projects.

Moving forward, BayREN seeks to further enhance the comprehensiveness of their offering by layering in non-ratepayer funding. For 2019, BayREN has received a grant from the Bay Area Air Quality Management District that will offer supplemental incentives for high efficiency emerging heating technologies for projects located in disadvantaged communities.

As BAMBE reaches substantial market share, we will begin to reduce and sunset the rebates as currently structured, replacing them in the mid- to long-term with other market drivers such as green labeling, local government policies, and financing. Incentives and technical assistance will then be restructured to support these mid- to long-term market drivers. The lead government agency implementer of the BayREN Multifamily program is currently implementing a grant from the California Energy Commission (CEC) that explores these market drivers and will establish recommendations on strengthening their impacts.

Multifamily Capital Advance Program

Program Description

The Multifamily Capital Advance Program (BAMCAP) advances up to 50% of the total loan principal related to the costs of approved energy efficiency measures, at 0% interest 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 BAMBE and minimize additional administration by leveraging the scope development and quality assurance provided by BAMBE or similar programs. BAMCAP 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 limited flexibility in the choice of lenders.

In 2018, BAMCAP launched a Lender Referral Service to determine if energy efficiency financing products that exist in the market can meet the needs of property owners looking to finance amounts under \$100,000. The service aims to simplify the financing decision-making process for property owners and reduce transaction costs for lenders by providing access to a pipeline of finance-ready energy efficiency projects.

2018 Goals and Strategies

- Continue to close deals and expand the roster of 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

- Obtained 1 new Participating Lender.

- Provided referral consulting services to 10 projects.
- Built up a pipeline of projects scheduled to close in 2019.

Opportunities in 2019 and Beyond

In 2018, BayREN conducted a study to analyze the volume and characteristics of energy efficiency projects that require external financing and identify the profiles of projects that are unable to obtain the necessary financing to move forward with the upgrade. We will use the results of that study to evolve the program design by developing options that meet the needs of projects that currently have no available financing.

Codes and Standards

Program Description

The mission of BayREN's Codes and Standards Program is to provide support for Bay Area local governments to increase energy performance of buildings by improving energy code compliance, increasing adoption of local energy policies, and ensuring that local government needs, and concerns are considered when state policies are developed.

The Program aims to achieve its mission by:

- Reinforcing and expanding local government capacities and knowledge relative to energy.
- Working with local building department staff to increase their support for energy efficiency and to help them enforce the energy code.
- Encouraging consideration and adoption of local energy policies.
- Testing innovative services, tools, and policies to assist local governments with energy code compliance.
- Building relationships with state, regional, and local stakeholders, and representing local government concerns.
- Promoting regional consistency and best practices in adoption and implementation of local energy policies.

Program Performance and Major Accomplishments

In 2018, the Codes and Standards program continued and expanded its activities, offering trainings, electronic tools, municipal ZNE technical assistance, regional forums, and

2018 Codes and Standards Goals

- Deliver 30 classroom training sessions, related to Title 24, Part 6 standards and develop new training modules at the request of local jurisdictions.
- Continue development and demonstration of electronic compliance enhancement and benchmarking tools.
- Offer ZNE-related design assistance for new and existing municipal projects.
- Support reach code team and Bay Area local governments in the adoption of local energy ordinances.
- Assist local jurisdictions in reviewing and commenting on proposed changes to Title 24 Part 6 Standards.

a co-sponsored reach code workshop, as well as supporting energy code compliance and improvement during the recovery from the 2017 North Bay Fires. Fifty-five jurisdictions in the Bay Area utilized one or more of the program offerings.

During 2018, we supported rebuilding efforts in Napa and Sonoma Counties following the 2017 North Bay Fires. These efforts included providing information at the Rebuild Green Expo on ways homeowners could save energy by going above code requirements, providing informational materials to permit centers, and partnering with PG&E, MCE, and the Bay Area Air Quality Management District to support the Advanced Energy Rebuild Program in Napa.

BayREN delivered 30 classroom training sessions to building professionals, primarily local building department staff, across the region. At the request of several local jurisdictions, we developed a new training module on heat pump water heaters, with input from Bay Area chapters of the International Code Council, as well as the California Energy Commission. That module was available starting in September and was delivered six times during the remainder of the reporting year.

In 2018, the Codes and Standards Program continued to develop and demonstrate potential opportunities for and benefits of electronic compliance enhancement tools (eTools). The CodeCycle platform continued to be used in two jurisdictions and was also expanded to a third. Taken together, the tool assessed T24 commercial lighting compliance for 71 projects, representing more than 1.2 million square feet of building space, providing improved compliance with the complex requirements of this portion of the Code. BayREN also continued its collaboration with Contra Costa County on the ePermit Tool, expanding it to cover re-roofing, as well as hot water heaters and fenestration. In addition, an online version of the expanded tool was developed that can be used by any jurisdiction in the Bay Area. The ePermit Tool will be launched and marketed in 2019.

The Codes and Standards Program also continued its Municipal Zero Net Energy (ZNE) Technical Assistance Subprogram, providing ZNE-related design assistance for a new community center in Millbrae and a pool complex and City Hall in Brisbane. A portfolio assessment for the City of Burlingame was also provided, which included examining all municipal buildings, identifying energy efficiency measures, and providing recommendations on the ZNE feasibility for each building.

This past year, BayREN hosted four “Regional Forums” that drew over 270 attendees. The topics of the 2018 forums were:

- Increasing Reliability and Resilience with Microgrids: How to Implement from Design to Interconnection.
- Innovative Approaches to Energy Code Compliance.
- Energy Code and Accessory Dwelling Units; Meeting Local Housing Need Efficiently.
- Energy and Material Efficiency in Carbon Smart Buildings.

In addition to the Forums, the Codes and Standards Program co-sponsored a workshop on reach codes in October together with the Statewide IOU Codes and Standards Team. The workshop was intended for local government staff interested in exploring a reach code for the 2019 code cycle. BayREN worked with the Statewide Team to conduct outreach for and present information at the workshop. Approximately 46 people attended the workshop, including staff from 18 jurisdictions.

Other efforts to support and encourage local adoption of reach codes continued and expanded to meet the Bay Area local governments' strong interest in reach codes. BayREN continued to participate in regional and statewide reach code working groups, to review cost-effectiveness studies, and to provide policy support to local governments. Looking ahead to the 2019 code cycle, BayREN worked with local governments to develop a timeline for actions for jurisdictions wanting to adopt a reach code to take effect on January 1, 2020. BayREN also supported and distributed a request for early cost-effectiveness studies to support that timeline, which over 30 jurisdictions endorsed, and which led to the decision by the statewide reach code team to develop the requested studies by early 2019. With the increased interest from local jurisdictions, BayREN also began to develop a set of webpages specifically written for local government staff to support their reach code efforts.⁵

Opportunities in 2019 and Beyond

With the approval of the Business Plan, BayREN is working to transition its Codes and Standards Program to a more robust program with a longer time horizon. Planned activities in 2019 include:

- Increased reach code support, in recognition of the widespread interest in reach codes among local governments for this code cycle and, related to that, a study of reach code implementation in Marin County, which will be used to provide new resources and continued support for local governments after a reach code is adopted.
- Continued work in support of local energy policies and activities, including hosting quarterly regional forums and providing technical assistance for municipal ZNE projects.
- Continued and expanded compliance improvement activities, including:
 - Making the expanded ePermit Tool available to all jurisdictions in the Bay Area and encouraging use through various outreach activities.
 - Working more closely with CodeCycle to make their eTool available to more local jurisdictions and to improve the tool and the means of integrating it with the local permitting processes.
 - Testing new “lunch and learn” events for contractors at local building departments.

⁵ www.bayrencodes.org/reachcodes

- Continuing and improving BayREN training offerings, including updates for the 2019 Code.
- Strengthening connections with local government staff, especially building department staff.

BayREN's Codes and Standards Program is also planning to conduct a survey of local governments in the Bay Area to update and expand findings from our 2013 survey. The survey will include questions about attitudes toward energy code enforcement, as well as familiarity with and desire for different types of resources. The results of the survey, together with feedback from key program stakeholders and partners including Bay Area building professionals, building departments, chapters of the International Code Council, will be used to inform future program offerings.

Water Bill Savings Program (WBSP)

Program Description

In 2018, the BayREN Water Bill Savings Program (WBSP)⁶ began work on a regional program derived from its partnership with three Municipal Water Utilities that currently provide their customers with the Pay-As-You-Save® offer: Install energy- and water-saving technologies with no up-front cost — through a monthly water bill surcharge that is significantly lower than the estimated savings.

As envisioned in the BayREN Business Plan, the WBSP team initiated planning activities for a regional program that will centralize funding and administration of a tariffed on-bill program to make the offer available to municipal water utilities and their customers throughout the Bay Area. Concurrently, the WBSP team continued to provide technical assistance and program support to its current Partner Utilities.

The forthcoming regional program will continue to offer the following assurances to WBSP customers who voluntarily install eligible program improvements:

- No up-front payment, no new debt obligation, no credit checks, and no liens.
- A utility-approved monthly tariffed efficiency charge that is lower than estimated generated savings.

2018 Water Bill Savings Goals

- Provide technical assistance and support for:
 - East Bay Municipal Utility District's Water Smart On-Bill Program.
 - City of Hayward's Green Hayward PAYS® Program.
 - Town of Windsor's Windsor Efficient PAYS® Program.
- Develop regional model for centralized funding and program delivery and initiate financing service development.
- Identify and map high-value markets based on demographic, water use, and other economic data.
- Deliver draft BayREN Water Bill Savings Program Framing Paper describing regional vision and implementation strategy.
- Increase marketing support for Partner Utility Programs.

⁶ Formally known as the BayREN Pay As You Save® (PAYS®) Program

- Repayment required only while the customer resides at the project location.
- A guarantee that failed improvements are repaired or the payment obligation ends.

Additionally, WBSP also helps local governments, residents, and businesses pursue property improvements required by code changes, time-of-sale requirements, and increasingly stringent water-use regulations.

Work to date has allowed the Town of Windsor, the City of Hayward, and East Bay Municipal Utility District (EBMUD) to provide single family and multifamily water customers with services to install high efficiency indoor plumbing fixtures and lighting measures, convert lawns to drought tolerant landscapes, retrofit hot water heating systems, and repair and upgrade irrigation systems. These cost-effective on-bill improvements are designed to produce total utility bill savings that exceed the monthly tariffed efficiency charge.

The current programs consist of:

- Town of Windsor – Windsor Efficiency PAYS® (since 2012): Single Family and Multifamily residential. Services include indoor plumbing fixtures and outdoor turf conversion to drought tolerate landscaping. As of June 2018, this program is in maintenance mode, supporting existing enrolled customers paying the on-bill surcharge but not enrolling new customers.
- City of Hayward – Green Hayward PAYS® (since August 2015): Multifamily residential indoor and landscaping services. Services include indoor plumbing fixtures, common area energy measures, and weather-based irrigation controllers.
- East Bay Municipal Utility District – EBMUD WaterSmart On-Bill Program (since July 2016): Multifamily residential indoor plumbing fixtures and multifamily/commercial landscaping component approved for test projects.

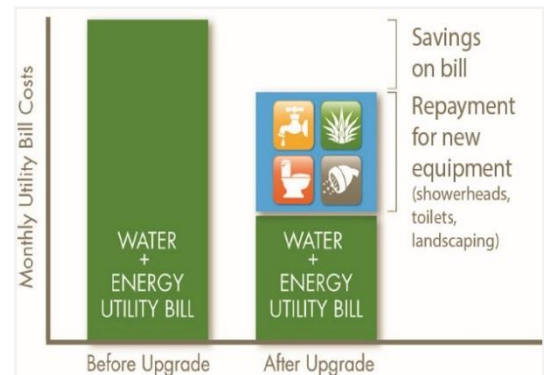


Figure 5: WBSP Concept Overview

Program Performance and Major Accomplishments

The three WBSP Partner Utilities have retrofitted 480 multifamily units and 247 single family homes. Major accomplishments for 2018 include:

- Supported Town of Windsor:
 - Finalized revisions to all program agreements for an updated program design for Windsor Efficiency PAYS® version 2, prior to the Town’s decision to keep their program in maintenance mode.
 - Engaged Town staff in the design process for the Regional Program. These staff have expressed interest in participating in the regional model once launched.

- Supported City of Hayward:
 - Completed two multifamily projects with a total of 24 units.
 - Supported marketing and outreach activities, including mailers, workshops, and customer intake.
 - Supported updates to Green Hayward PAYS® disclosure and account transfer processes for successor customers at locations with program surcharge.
- Supported East Bay Municipal Utility District:
 - Completed one multifamily project with a total of 50 units.
 - Provided technical assistance for a prospective on-bill project with an EBMUD water customer who operates a laundromat.
- Advanced a regional model and program design:
 - Identified high-value markets based on demographic, water use, and other economic data.
 - Delivered draft BayREN Water Bill Savings Program Framing Paper describing regional vision and implementation strategy.
 - Secured support of ABAG/MTC staff to engage on Regional Program development, including options for ABAG to facilitate access to up-front program capital and administer necessary program agreements.

Opportunities in 2019 and Beyond

Per D.18-05-041, BayREN programs should align by “filling gaps,” “piloting unique approaches that have the potential to scale,” “targeting hard-to-reach customers,” “providing value to ratepayers in terms of energy savings and/or market transformation results,” “managing programs with an eye toward long-term cost-effectiveness,” and “adding value based on — relationships with local stakeholders.” The regional WBSP will fulfill these CPUC goals by providing a unique on-bill model that enables historically hard-to-reach customers to participate with no upfront cost; delivering assured utility bill savings; initiating a scalable centralized funding and administrative structure to decrease project costs and increase consistent program delivery; establishing ally relationships with local stakeholders; and achieving sufficient scale to attain self-sustaining status, cover funding and administration costs with program surcharges.

The design and launch of the regional WBSP program will build on the success of the three pilots and Commission directives to provide a scalable, centralized on-bill service to all Bay Area municipal water utilities and their customers.

Water Bill Savings Program will provide:

- Access to capital at scale with the lowest possible interest rate and most flexible terms to lower

project costs and ensure greater participation.

- No upfront cost service that makes it easy for:
 - Customers of all income levels to install measures and lower their utility costs.
 - Local governments, residents, and businesses to pursue property improvements required by code changes, time-of-sale requirements, and increasingly stringent water-use regulations.
- Scalable, centralized administration that provides model tariffs; program agreement oversight; program contractor recruitment and oversight; customer project oversight, Quality Control/Quality Assurance, and verification to start surcharge; marketing and customer enrollment; and customer repayment tracking.

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 (PAs) and Capital Providers (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”: building owners, first mortgage lenders, capital providers/PACE administrators, and perhaps most importantly, contractors.

BayREN’s C-PACE program consultant, Sustainable Real Estate Solutions (SRS), has continued to deliver a recurring training and support program for Bay Area commercial contractors. SRS’ technical and financial underwriting systems and tools have been used to support project development for potential C-PACE projects and provided illustrations of other comparative finance options. In 2018, the program continued assisting in the development of projects in the pipeline and expanding engagement to important market actors such as commercial HVAC contractors, who have traditionally not participated in energy efficiency programs. Program efforts for these contractors, who are primarily called upon to replace failing equipment, now concentrate on marshalling existing EE resources (rebates, incentives, and technical assistance) to generate additional savings that turn the capital cost of the replacement project

2018 Commercial PACE Goals

- Continue to build upon prior year program activities.
- Create a BayREN-branded Energy Efficiency Advisory (EEA) service that is highly versed in C-PACE and can provide guidance on multiple financing solutions.
- Introduce new tools and forms to streamline property qualification for C-PACE financing, reducing risks and uncertainties for contractors who are investing their valuable time and resources into the development process.
- Continue offering targeted ongoing contractor training and education, while shifting resources to one-on-one contractor assistance.

into an energy efficiency investment that achieves positive cash flow.

Program Performance and Major Accomplishments

In 2018, direct assistance to commercial contractors on multiple project opportunities continued, including project scenario development, attending owner meetings, and validation of savings estimates. Three building owners received assistance in designing projects that, while ultimately closed, chose financing options other than C-PACE. SRS was able to help each of these owners examine their buildings for other energy savings opportunities and in two of the projects, additional measures were included that otherwise would have not been implemented without BayREN assistance.

Highlights from these efforts are:

- Ni Cristo Iglesias (church in Burlingame, CA)
 - \$225,000 HVAC Energy Management System and LED lighting.
 - BayREN assisted with lighting assessment and comparative finance options.
 - Building owner used denominational funding mechanism over C-PACE financing.
- 333 Hegenberger Road LLC (multi-tenant office building in Oakland, CA)
 - \$138,000 HVAC work and exterior LED lighting.
 - BayREN assisted with lighting assessment and comparative finance options.
 - Project was funded as part of an acquisition instead of C-PACE financing.
- The Meadow Club (Golf Course in Fairfax, CA)
 - \$235,500 HVAC Energy Management System.
 - BayREN helped develop the project for C-PACE financing.
 - Owner financed with existing bank.

Opportunities in 2019 and Beyond

Beginning in Q2 2019, the C-PACE subprogram will transition its successful components into the upcoming BayREN Small and Medium Pay-for-Performance (P4P) Commercial Program (see below), which will provide a range of unique technical and financial resources (Building Performance Advisor, P4P incentives, microloans, and C-PACE) to help building owners complete upgrades that achieve deep and persistent savings. To that end:

- BayREN's Small and Medium P4P Commercial Program will leverage mechanical contractor relationships created through the C-PACE program to access "hard-to-reach" and underserved owners and customers.
- BayREN Commercial's new Building Performance Advisor (BPA) service will build off and learn from the successes of the Energy Efficiency Advisor services provided through the C-PACE

program.

- SRS will complete a knowledge and data transfer from C-PACE program efforts to ensure a smooth transition and maintain engagement with existing relationships.

BayREN's Commercial Resource Program, approved in D.18-05-041, will build on the C-PACE program design and experience by launching a P4P program that will target small and medium non-residential buildings and businesses in the Bay Area. The P4P program will be implemented by "Program Allies" who will deliver turnkey services including technical assistance, project financing, installation support, and performance monitoring, with contracted performance and savings goals. The program will utilize an innovative meter-based savings incentive structure that conforms with Commission-approved normalized metered energy consumption (NMEC) savings calculation methodologies. The Building Performance Advisor will also support BayREN's commercial program by offering technical assistance and project development support to the general market, with an emphasis on engaging with hard-to-reach customers throughout the region, and then referring leads to the P4P program, BayREN Microloans, or programs offered by others. Because the Program will launch mid-2019, there are no reportable metrics for 2018.

Evaluation, Measurement and Verification (EM&V)

Program Description

In D.12-11-015, the RENs were authorized for the first time to conduct their own EM&V studies. BayREN's EM&V budget was approved in late 2017.

Program Performance and Major Accomplishments

The following studies began and/or concluded in 2018:

1. Single Family Moderate Income Market Characterization Study

This study supports the upcoming change to the single family program offering. Specifically, as proposed in the Business Plan, BayREN will transition out of implementing the Home Upgrade Program and create a new suite of programs targeted at encouraging higher participation by moderate income single family homeowners and renters. The study completed in September 2018 and characterized this target population residing in the BayREN territory by completing a detailed literature review; conducting in-depth interviews with BayREN members, Chief Building Operators (CBOs) and other stakeholders; and an online survey of 466 single family moderate income households. The study also identified the main barriers of participation for the target market including financial barriers, low energy costs and expected savings, and their renter status. The services desired by the target market were recognized along with potential program design considerations. The findings of this study served as a basis for the design of new program that will be implemented in 2019.

2. Residential Contractor Research

This research study focused on understanding the market of available contractors for BayREN's single family program as well as gaining insights from current participating contractors. The research took place over several months, beginning in July 2018 and is expected to be completed by early 2019. Two memos and one annotated bibliography was completed in 2018, and the final memo is expected to be completed in 2019. The activities completed in 2018 provided BayREN a detailed description of the active participating contractors and population level statistics on all the contractors within BayREN territory along with a literature review focused on exploring the type of contractors and barriers experienced by contractors in the California Home Upgrade program and similar programs outside of California. The final memo will focus on presenting the results from BayREN's participating contractors' survey and in-depth interviews of near or past participants of the program.

3. Small Medium Business (SMB) Non-Deemed Market Characterization Study

For the SMB market, BayREN began a study in 2018 to assess the general presence and relative size (preponderance of) certain energy consuming equipment and measure types that currently receive little-to-no ratepayer incentives and are considered capital intensive. Major objectives were to determine the

relative market size and retrofit opportunity of these measures and equipment types, and associated costs and savings potential. The study enabled BayREN and other Program Administrators to evaluate the range of possible investment levels to access these stranded savings, increase understanding of the specific market drivers that may be leveraged, and inform potential incentive and financing options, market needs, and possible outreach strategies. The final report was released in June 2018 and can be read in its entirety on CALMAC website.⁷ There are seven key themes that emerged from the study:

- Businesses that qualify for the survey (and, implicitly, who qualify for BayREN programs) are smaller, but do not include large numbers of micro-businesses.
- Most respondents say that they already lean toward the use of energy efficient (EE) equipment.
- Respondents tend to express attitudes that are already very supportive of energy efficiency and green actions.
- Many respondents say they would participate in each of the programs tested by BayREN.
- Upfront costs are important barriers to EE adoption, but other barriers are also important.
- This group of businesses is diverse in their reasons for participating in new EE programs, and as a result, find different program features attractive.
- A segmentation analysis reveals a somewhat complex program marketing picture.
 - More information associated with each of these themes is provided in the sections below.

4. Water Bill Savings Process Evaluation

In 2018, BayREN conducted a process evaluation study of the three Water Bill Savings pilots: Windsor Efficiency PAYS®, Green Hayward PAYS®, and East Bay Municipal Utility District's WaterSmart On-Bill Program. The study goal was to provide feedback on the existing programs to help inform the development of a regional Water Bill Saving Program. The 11-month study drew on interviews with participating customers, water districts, and contractors as well as a review of all available program databases and materials. Completed in early 2019, the study concluded: "[T]here is a good foundation for a regional effort led by BayREN. BayREN has already established and standardized many of the processes across the water districts. As such, BayREN is a valued resource for participating water districts. Our overarching finding is that BayREN's existing programs are paving the way for the future regional program." The study also noted: "In addition to high levels of participant satisfaction, water districts and the current installation contractor are also highly satisfied." The study's assessment of opportunities and challenges inherent in moving to a regional approach will inform the program design and implementation.

⁷ <http://www.calmac.org/AllPubs.asp>

5. CodeCycle Demonstration Project Process Evaluation

BayREN conducted this study at the end of 2018 to obtain an objective analysis of how the CodeCycle Demonstration Project is currently functioning, the value of the project, barriers the project is experiencing, and how to improve it. The study involved in-depth interviews with current and prior users, discussions with BayREN and CodeCycle, and a review of relevant documents and reports. Based on the information collected, the study provided recommendations for moving forward with and improving the Demonstration Project, as well as potential topics for future research. Findings and recommendations included:

- Identification of four barriers to use of the tool: lack of building department time and resources; difficulty integrating the tool into existing processes; concerns about access for outside parties; and limited value of a lighting-only solution.
- Recommendations included:
 - Focusing on plan checkers within building departments who already have a process for electronic submission of plans.
 - Expanding the software to cover more than commercial lighting.
 - Reconfiguring the software to work on all operating systems.
- Redesigning the process of integrating with building departments.

6. Multifamily small project finance product

Through the Bay Area Multifamily Capital Advance Program (“BAMCAP”) BayREN has offered co-financing at zero-percent interest to Bay Area multifamily property owners since 2014. Through this pilot, BayREN has recruited 6 participating lenders, and lent more than \$2 million in program capital. However, projects with financeable amounts of less than \$100,000 do not justify the administrative costs borne by the participating lenders using this program model. This study will characterize the demand for financing projects with out-of-pocket costs of less than \$100,000. The results will be used to determine if there is a need for a small project finance product and provide recommendations regarding program design and marketing. The final report is expected in late 2019.

Energy Savings

In 2018, BayREN administered two resource programs within the Residential Sector that have reported energy savings: The Single Family Home Upgrade and Multifamily Building Enhancement Programs.

Single Family Home Upgrade

The original compliance filing goals filed in 2012 and April 2013 were based on Regional Energy Network (REN) workpapers that were not approved by the Energy Division. Subsequently, BayREN utilized approved IOU workpapers, 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 for 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. The tool underwent major updates to accommodate revised time of use (TOU) and shifts in demand peak hours. Custom measures such as lighting are modeled using IOU workpapers and custom calculators, which have been approved by the CPUC.

Table 1: Electricity and Natural Gas Savings and Demand Reductions

| Electricity and Natural Gas Savings and Demand Reduction (Net) | 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 | 0.38 | 9.25 | 1.22 | 22.39 | 0.543 |
| Multifamily Savings | 1.64 | 25.85 | 1.21 | 19.71 | 0.307 |
| Total Portfolio Savings | 2.02 | 35.11 | 2.43 | 42.11 | 0.85 |
| CPUC Goal Adopted ⁸ | 2.69 | 40.53 | 3.05 | 49.23 | 1.172 |
| % of Goal | 75% | 87% | 80% | 86% | 73% |

⁸ CPUC approved goals for the 2018 Annual Budget Advice Letter submission. D.18-05-041 instructed PAs to refile their 2018 Budgets in CEDARS, but PAs did not update their energy savings to reflect the changes in the budget due to the constrained time frame, so the goals are based on the original budgets prior to approval of Business Plan budgets.

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. Although emissions data are available through the CET, D.12-11-015 does not direct BayREN to track emissions.

Table 2. Environmental Impacts (tons of avoided emissions)⁹

| Annual Results 2018 | Annual CO2 (tons) | Lifecycle CO2 (tons) | Annual NOx (tons) | Lifecycle NOx (tons) | Annual PM10 (tons) | Lifecycle PM10 (tons) |
|------------------------|-------------------|----------------------|-------------------|----------------------|--------------------|-----------------------|
| Single Family | 831 | 15,257 | 79 | 1,373 | 38 | 668 |
| Multifamily | 882 | 14,317 | 222 | 3,518 | 114 | 1,799 |
| Total Portfolio | 1,713 | 29,575 | 302 | 4,891 | 152 | 2,467 |

⁹ Environmental Impacts are Gross Annual and Lifecycle Tons of Avoided Emissions.

Expenditures

Table 3. 2018 Program Expenditures

| Program Name | 2018 Adopted Program Budget | 2018 Operating Program Budget | 2018 Program Expenditures | Expenditures as % of Operating Budget | Expenditures as % of Portfolio Expenditures |
|------------------------|-----------------------------|-------------------------------|---------------------------|---------------------------------------|---|
| Single Family | \$7,890,580 | \$8,498,041 | \$7,832,880 | 92% | 46% |
| Multifamily | \$6,881,200 | \$7,137,700 | \$6,833,585 | 96% | 41% |
| Codes and Standards | \$1,660,370 | \$1,336,874 | \$1,194,640 | 89% | 7% |
| Financing | \$2,515,712 | \$1,975,247 | \$840,204 | 43% | 5% |
| EM&V | \$257,755 | \$257,755 | \$148,602 | 58% | 1% |
| Total Portfolio | \$19,205,617 | \$19,205,617 | \$16,849,911 | 88% | 100% |

Table 4. 2018 Program Expenditures by Category

| Program Name | 2018 Program Expenditures | 2018 Administrative Costs | 2018 Marketing Costs | 2018 Direct Implementation Costs | 2018 Incentives Paid |
|------------------------|---------------------------|---------------------------|----------------------|----------------------------------|----------------------|
| Single Family | \$7,832,880 | \$396,927 | \$1,004,261 | \$1,916,492 | \$4,515,200 |
| Multifamily | \$6,833,585 | \$321,405 | \$138,848 | \$2,391,582 | \$3,981,750 |
| Codes and Standards | \$1,194,640 | \$135,854 | \$- | \$1,058,786 | \$- |
| Financing | \$840,204 | \$175,511 | \$96,215 | \$568,479 | \$- |
| EM&V | \$148,602 | \$148,602 | \$- | \$- | \$- |
| Total Portfolio | \$16,849,911 | \$1,178,298 | \$1,239,323 | \$5,935,339 | \$8,496,950 |

Cost-Effectiveness

While the RENs are not subject to the same cost-effectiveness test that the IOUs are because of the limitations on the programs that can be offered, (i.e., implementing those programs that are the most difficult, both in design and implementation, programs that the IOUs do not want to offer for these reasons, and serving hard-to-reach markets), BayREN has an eye toward cost-effectiveness. The Commission has recognized that it is not realistic to expect REN programs to be cost-effective within the traditional IOU definition.¹⁰ With these restrictions, and far smaller portfolios, RENs do not have the advantage of using high savings programs (such as large commercial or industrial) to balance residential and small commercial activities that typically and historically have low cost-effectiveness.

The Total Resource Cost Test (TRC) measures the net benefit of a program relative to the participant and administration costs. Total TRC costs in Table 5 are the sum of total administrative costs and incremental measure or participant costs. The Program Administrator Cost Test (PAC) measures net benefits relative to total program costs (including incentive and administration costs). Total PAC costs in Table 5 are the sum of total program administrative and incentive costs.

Table 5. 2018 Cost-Effectiveness

| Program | TRC Cost to Billpayers (TRC) | Total Savings to Billpayers (TRC) | Net Benefits to Billpayers (TRC) | TRC Ratio | PAC Cost to Billpayers (PAC) | PAC Ratio | Levelized Cost TRC | Levelized Cost PAC |
|-----------|------------------------------|-----------------------------------|----------------------------------|-----------|------------------------------|-----------|--------------------|--------------------|
| Portfolio | \$19,254,472 | \$6,535,975 | \$(12,718,497) | 0.34 | \$16,384,526 | 0.40 | \$1,190 | \$1,261 |

¹⁰ CPUC D. 12-11-015, page 18

Savings by End-Use

Only the Single Family Home Upgrade and BayREN Multifamily Building Enhancement Programs contributed to 2018 installed energy savings.

Table 6. 2018 Annual Net Savings

| Annual Results (Net) | 2018 Annual Savings | | |
|------------------------|---------------------|-------------|-------------|
| | Electric (GWh) | Demand (MW) | Gas (MMTh) |
| Single Family | 0.38 | 0.54 | 1.22 |
| Multifamily | 1.64 | 0.31 | 1.21 |
| Total Portfolio | 2.02 | 0.85 | 2.43 |

Table 7. Annual Net Savings by End-Use

| Use Category | GWH | % of Total | MW | % of Total | MMTh | % of Total |
|--------------------------|-----|------------|----|------------|------|------------|
| Appliance or Plug Load | 0 | 0% | 0 | 0% | 0 | 0% |
| Building Envelope | 0 | 0% | 0 | 0% | 0 | 0% |
| Compressed Air | 0 | 0% | 0 | 0% | 0 | 0% |
| Commercial Refrigeration | 0 | 0% | 0 | 0% | 0 | 0% |
| Codes and Standards | 0 | 0% | 0 | 0% | 0 | 0% |
| Food Service | 0 | 0% | 0 | 0% | 0 | 0% |
| HVAC | 0 | 0% | 0 | 0% | 0 | 0% |
| Irrigation | 0 | 0% | 0 | 0% | 0 | 0% |
| Lighting | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Savings Measure | 0 | 0% | 0 | 0% | 0 | 0% |
| Process Distribution | 0 | 0% | 0 | 0% | 0 | 0% |
| Process Drying | 0 | 0% | 0 | 0% | 0 | 0% |
| Process Heat | 0 | 0% | 0 | 0% | 0 | 0% |
| Process Refrigeration | 0 | 0% | 0 | 0% | 0 | 0% |
| Recreation | 0 | 0% | 0 | 0% | 0 | 0% |

| | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Service and Domestic Hot Water | 0 | 0% | 0 | 0% | 0 | 0% |
| Whole Building | 2.02 | 100% | 0.85 | 100% | 2.43 | 100% |
| BayREN Annual Net Portfolio Savings | 2.02 | 100% | 0.85 | 100% | 2.43 | 100% |

D.18.05.041 Metrics

2018 BayREN metrics are provided in the Annual Report Excel Template, uploaded to EE stats. This section discusses some of the approaches and assumptions used to develop the metrics by sector.

Residential Sector

For the following residential metrics, BayREN used data provided by PG&E:

- Multifamily:
 - Percent of participation relative to eligible population (by unit).
 - Average energy use intensity of multifamily units; kWh and Therms.
 - Percent of benchmarked multifamily properties relative to the eligible population.
 - Percent of benchmarking by properties defined as “hard-to-reach”.
- Single Family:
 - Percent of participation relative to eligible population.
 - Average energy use intensity of single family homes.

PG&E does not have a process for collecting total number of eligible multifamily properties, so BayREN used CoStar data for the metric “*Percent of participation relative to eligible population by property*”. All other data are derived from BayREN’s internal tracking database(s) and outputs from the 2018 Annual Claims submission submitted on California Energy Data and Reporting System (CEDARS).

Commercial Sector

BayREN’s Commercial Resource Program was approved in May of 2018. The Program will launch mid-2019. Thus, there are no metrics to report for 2018.

Codes and Standards Sector

Several metrics from D.18-05-041 are assigned to REN Codes and Standards Programs, and are reported below, along with additional metrics.

Reach Code Adoption

The Decision states that the number of local government reach codes implemented is a joint IOU and REN effort. As such, the IOUs will be reporting on adoption of reach codes throughout the state in their metrics filings, which includes BayREN’s numbers. We highlight the adoption of reach codes within the Bay Area during each building code cycle:

- Jurisdictions adopting one or more reach codes during the 2016 code cycle: 11

Participation in Forums

In addition to the approved metric of the number and percentage of jurisdictions with staff participating in an Energy Policy Forum, we also use the metric of the total number of attendees. In 2018, there were:

- Jurisdictions with staff participating in a Forum in 2018: 33 (30%)
- Total attendees at BayREN Forums in 2018: 273

Jurisdictions Receiving Energy Policy Technical Assistance

This metric calls for the number and percent of jurisdictions receiving energy policy technical assistance. BayREN offers this type of assistance through the compliance and policy support activities described above. (Note that this number does not include additional types of assistance such as answering questions and providing information to jurisdiction staff.)

- Jurisdictions in the Bay Area receiving energy policy technical assistance: 41 (38%)

Buildings Receiving Enhanced Compliance Support

A few of BayREN's Codes activities support code compliance for individual buildings. These are aggregated and reported here.

- Buildings in the Bay Area receiving enhanced compliance support: 90

Increase in Closed Permits

To address this metric, BayREN needs to set up a new subprogram. During the latter part of 2018, the Codes Team conducted a literature review to summarize what is known about energy code related permit rates in California, both in terms of projects that open permits but do not close them, and projects for which permits are never pulled. Key findings include:

- The literature contains limited data on actual permitting rates, with data unavailable for many types of projects such as re-roofing, fenestration, water heating, insulation, and lighting.
- Data on permit closure rates are even harder to find.
- Even for permitted projects, compliance with HERS and energy code documentation is lacking.

In addition, the Codes Team also carried out a preliminary assessment of building permit data in the Bay Area to determine the availability of these data and their usability. Two of the main findings were:

- Some, but not all, Bay Area jurisdictions have analyzable building permit data online.
- There is no standard way to find building permit data for projects that trigger the energy code, although it is possible to search the description field for key terms such as "water heater."

Given these findings, BayREN has determined that the best approach to this metric would be to start with a demonstration project, working closely with a small number (1-3) of local jurisdictions that are both

interested in increasing their permit closure rates and willing to work with BayREN. In 2019, BayREN will approach local jurisdictions to identify potential partners and understand their current permitting system, permit rates, factors that could be affecting those rates, and potential interventions. This activity will in turn allow BayREN to establish a baseline for this metric, an approach to test, and a methodology for tracking changes in permitting rates. We aim to have identified one or more local jurisdictions to work with in 2019.

Commitments

Commitments provided in Table 8 were made in the past year with expected implementation by December 2019.

Table 8. Commitments

| Program | Committed Funds | Expected Energy Savings | | |
|------------------------|-----------------------|-------------------------|-------------|-------------|
| | | GWh | MW | MMth |
| Single Family | \$413,875 | 0 | 0 | 0 |
| Multifamily | \$1,539,750 | 0.92 | 0.08 | 0.88 |
| EM&V | \$105,196.75 | 0 | 0 | 0 |
| Total Portfolio | \$2,058,821.75 | 0.92 | 0.08 | 0.88 |

Appendix A: BayREN Programs for 2018

| CEDARS 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 (Water/Energy Nexus) ¹¹ | 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 |
| BayREN05 | Evaluation, Measurement & Verification (EM&V) | 1/1/2017 | N/A |

¹¹ After the D. 18-05-041 on the Business Plans, PAs were instructed to map their existing programs to the Business Plan Sectors. BayREN04 Financing is now shown as “Water/Energy Nexus” in CEDARS since there is not a Financing Sector in the Business Plans, however this is the same program(s) as prior years.