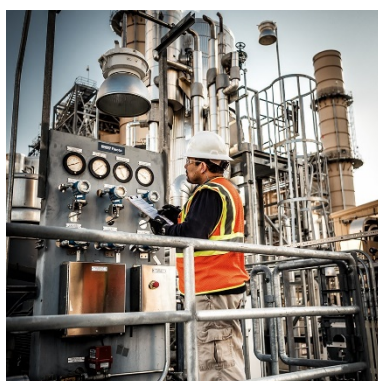




*Pacific Gas and
Electric Company®*

2018 ENERGY EFFICIENCY ANNUAL REPORT



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Table of Contents

EXECUTIVE SUMMARY	2
ANNUAL REPORT DATA	5
PROGRAM DESCRIPTIONS AND STRATEGIES	6
Residential Program	7
Commercial Program.....	16
Public Program.....	24
Industrial Program	40
Agricultural Program.....	49
Codes and Standards.....	57
Workforce Education & Training	67
Financing Program	73
Integrated Demand-Side Management.....	76
TABLES AND APPENDICES.....	80
Section 1 Energy Savings.....	80
Section 2 Emission Reductions	81
Section 3 Expenditures.....	81
Section 4 Cost-Effectiveness.....	82
Section 5 Bill Impacts	83
Section 6 Savings by End Use	84
Section 7 Commitments	85
Section 8 Shareholder Performance Incentives	86
Section 9 Metrics.....	87
Appendix A PG&E Program ID Numbers.....	88
Appendix B Regulatory Decisions, Rulings, and Advice Letters.....	91
Appendix C Third-Party Contract List	95



Executive Summary

Serving residential, commercial, industrial, agricultural, public, and other customers across the state, Pacific Gas and Electric Company (PG&E) delivers energy efficiency (EE) solutions that empower customers to eliminate unnecessary energy use, reduce their carbon footprint, and save money. In 2018, PG&E continued its role as a leader in EE, delivering a dynamic portfolio of programs.

PG&E serves the diverse needs of more than 16 million customers across our 70,000 square-mile service territory through 10 statewide program sectors and nearly 100 subprograms.¹ 2018 saw the continuation of ambitious EE partnerships and successful programs, as PG&E focused on key initiatives to drive deep energy savings and position the state to meet its ambitious EE and carbon reduction goals. These initiatives are described in the following sections.

Transitioning to a New Energy Efficiency Paradigm

On January 11, 2018, the California Public Utility Commission (Commission or CPUC) issued Decision (D.)18-01-004, which formalized the third-party solicitation process for EE programs and established key milestones in the path to maintaining a predominantly third-party implemented EE portfolio by 2023. The first milestone established was December 31, 2018, by which PG&E was expected to have a minimum of 25 percent of the portfolio administered by third-parties.

2018 also marked the starting line for PG&E's EE Business Plan for 2018-2025, which was formally approved by the Commission mid-year in D.18-05-041. D.18-05-041 also extended the 25 percent third-party portfolio implementation deadline to December 19, 2019. To meet the requirements of these two key Commission Decisions, PG&E engaged in extensive foundational work to meet the Commission's new third-party EE program requirements for PG&E's EE portfolio in 2018 and beyond. Preparations for the third-party program solicitations as described in PG&E's Business Plan, were the central focus of the year, with the first Request for Abstracts (RFA) launched in Q4 2018. PG&E also partnered with the other investor-owned utilities (IOU)

PG&E Exceeded 2018 CPUC- Adopted Energy Savings Goals and Delivered a Cost-Effective EE Portfolio

In 2018, PG&E exceeded its electric savings goals:

- 131% of its net electric energy savings goal (1,288 net annual gigawatt-hours (GWh))
- 168% of its net electric demand reduction goal (343 net summer peak megawatts (MW))

Codes and Standards (C&S) Advocacy exceeded its 2018 goals:

- 148% of its net electric goal (790 net annual GWh)
- 147% of its net electric demand reduction goal (177 net summer peak MW)
- 107% of its net gas savings goal (15 million therms)

PG&E's total 2018 EE portfolio was cost-effective, at 1.43 TRC and 4.15 PAC (includes net C&S with 5 percent market spillover).

PG&E's EE programs avoided 313,782 tons of carbon dioxide in 2018, continuing as a strong partner in helping reduce California's greenhouse gas (GHG) emissions.

¹ Note that some individual subprograms are called "programs" in their CEDARS name, but this report refers to them as subprograms.



to prepare for and launch upcoming statewide solicitations and the new EE statewide structure, laying the groundwork for statewide programs in 2018 and beyond.

Extending the Reach of Customers' Energy Efficiency Dollars through Financing

PG&E's EE financing subprograms continued to play a critical role in the overall portfolio in 2018, allowing customers to pursue large, comprehensive efficiency retrofit projects that might not have otherwise been financially feasible. The On-Bill Financing (OBF) subprogram delivered 781 loans across the agricultural, commercial, institutional, industrial, and multifamily sectors in 2018 worth a total of \$37.8 million, a 41 percent increase over the 553 loans extended in 2017.

In 2018, PG&E filed a Petition for Modification (PFM), seeking permission to expand the loan limits and update the contract terms of OBF projects, enabling the program to reach previously underserved sectors with larger projects and great energy savings potential. The PFM was approved by D.19-03-001 in March of 2019, granting PG&E the ability to offer all qualifying non-residential customers loans of \$250,000 per premises, with exceptions, and up to \$4 million for unique energy savings opportunities.² This change will enable expanded projects across many of PG&E's diverse customer sectors with the potential for greater energy savings.

Pursuing Savings through Energy Management Technologies and Connected Homes

In 2017, PG&E expanded residential energy management technologies and solutions for EE customers. Specifically, the PG&E Marketplace³ tool was expanded to include smart thermostats, connected home products, and connected applications, which help customers manage their energy use through data provided by PG&E's Share My Data platform. In 2018, nearly 35,000 customers received a rebate for adopting smart thermostat technology.

Continuing the Commitment to Respond, Rebuild, Resilience

As part of PG&E's commitment to meet the challenges of extreme weather resulting from climate change, PG&E began offering doubled new construction EE incentives, known as the Advanced Energy Rebuild (AER), for customers who lost their homes in the October 2017 Northern California wildfires. PG&E collaborated with Sonoma Clean Power (SCP), the Bay Area Air Quality Management District (BAAQMD), and Marin Clean Energy (MCE) to offer a one-stop shop for customers in Sonoma, Mendocino, and Napa counties who lost their homes to wildfires, allowing customers to access offerings from three different organizations with a single application.

On March 19, 2019, the Commission granted PG&E's supplemental request⁴ to provide this support to the victims of the 2018 wildfires, effectively expanding AER offerings to apply to all customers rebuilding a destroyed home or building subject to the 2016 Title 24 code.

² D.19-03-001.

³ <https://marketplace.pge.com/>.

⁴ PG&E ALs 4068-G and 5479-E.



Expanding of Meter-Based Energy Efficiency Programs

PG&E continues to launch programs that measure savings at the meter, an approach known as Normalized Metered Energy Consumption (NMEC). Unlike traditional methods for estimating energy savings, NMEC uses actual energy use to estimate the savings resulting from EE actions. Following solicitations in 2017, PG&E launched the Residential Pay-for-Performance program and the Industrial Strategic Energy Management (SEM) program and expanded the OBF offering to allow for the use of meter-based savings. These activities represent important milestones for the NMEC approach to savings estimation, and PG&E looks forward to sharing its learnings to develop best practices for NMEC statewide and accelerate the adoption of these approaches moving forward. PG&E expects meter-based savings offerings to continue to expand, further solidifying EE as a reliable and scalable grid resource.

Supporting California's Energy Goals

PG&E's advocacy and Compliance Improvement (CI) activities extend to virtually all buildings and appliances sold in California and support California's ambitious climate and energy goals. PG&E's technical experts contributed to adoption of 2019 building EE codes that achieved the goal of having all new construction be "zero net energy" (ZNE) for all single family and low-rise multifamily by 2020. PG&E continues to move California towards the goal of ensuring non-Residential New Construction (RNC) ZNE buildings by 2030 and other major objectives, including: carbon reduction targets to hit by 2020⁵ and 2030;⁶ a cumulative doubling of statewide EE savings in electricity and natural gas final end-uses by 2030⁷ to reduce existing building energy usage by 50 percent; establishing near-zero-emission building technologies to significantly reduce the emissions of GHG from buildings.⁸

Training the Energy Efficiency Workforce of the Future

PG&E provided people who design, build, operate, and maintain buildings and building systems the relevant education needed to create and effectively operate energy efficient buildings. Demonstrating leadership in the local, state, and national EE workforce arenas in 2018, PG&E held 494 classes, provided over 100 technical consultations, and hosted over 170 outreach events. To better serve hard-to-reach customers, PG&E launched on-demand, web-based training, which was operational for its first full year in 2018 and garnered over 1,300 class registrations.

Conclusion

PG&E's 2018 Annual Report describes the full set of programs delivering cost-effective energy savings for our customers. PG&E will continue to deliver on its commitment to customers and its commitment to California to deliver cost-effective EE and carbon reduction goals through innovative program and pilot strategies and excellence in program administration.

⁵ Assembly Bill (AB) 32 codified in California Global Warming Solutions Act of 2006.

⁶ AB 398 and Senate Bill (SB) 32 codified in Health and Safety Code Sections 38501(i) and 38566.

⁷ SB 350 codified in Clean Energy and Pollution Reduction Act of 2015.

⁸ SB 1477 codified in Public Utilities Code 921.1.



Annual Report Data

D.17-09-025 established annual energy savings and demand reduction targets for the 2018 IOU resource programs and C&S Advocacy on a net basis. In 2018, PG&E achieved 1,288 net GWh, which is 131 percent of its electric energy savings goal; 343 net summer peak MW, which is 168 percent of its electric demand reduction goal; and 30 million net therms, which is 97 percent of its gas savings goal. In addition to helping customers save energy and money, PG&E's portfolio of EE programs continued to contribute significantly to the state's goal of reducing GHG emissions, with avoided annual emissions of 313,782 tons of carbon dioxide. PG&E's total portfolio was cost-effective, achieving a 1.43 Total Resource Cost (TRC) ratio⁹ and 4.15 Program Administrator Cost (PAC) ratio, including C&S advocacy. Please see Section 4 for more specifics on PG&E's portfolio cost-effectiveness.

The C&S Advocacy program achieved 148 percent of its net electric goal, (790 net annual GWh), 147 percent of its net electric demand reduction goal (177 net summer peak MW), and 107 percent of its net therm goal (15 million therms).

Total 2018 portfolio net energy savings shown in this report include savings associated with PG&E's deemed savings subprograms, comprised of Database for Energy Efficient Resources (DEER) and final approved work paper values from the 2018 energy savings projects; savings associated with custom projects that were installed in 2018; savings associated with behavioral subprograms implemented in 2018; savings for the Bay Area Regional Energy Network (BayREN) and MCE as reported in their 2018 Annual Reports; and Energy Savings Assistance (ESA) Program savings.

D.09-09-047 defined, and D.12-11-015 clarified, the 10 percent utility administrative cost cap, the 6 percent marketing cost cap, the 4 percent Evaluation, Measurement and Verification (EM&V) cost cap and the 20 percent direct implementation non-incentive target. The 2018 EM&V budget is 4 percent of the program portfolio, including BayREN, MCE and statewide Marketing, Education and Outreach (ME&O). Statewide ME&O is excluded from the marketing cap.¹⁰ PG&E reports its progress against these caps and targets in quarterly reports posted on the CPUC's California Energy Data and Reporting System (CEDARS)¹¹ along with quarterly fund shifting reports. PG&E's monthly expenditure and savings reports are also posted on EE Stats.¹²

⁹ Includes net C&S. All savings values include 5 percent market spillover in cost-effectiveness calculations per D.12-11-015 (Ordering Paragraph (OP) 37) including C&S. Excludes ESA, BayREN, MCE, and Statewide ETP costs and benefits. The Financing Program OBF Loan Pool amounts (loans issued and repaid) of \$8.3M for 2017 are excluded per D.09-09-047, p. 288.

¹⁰ D.13-12-038, p. 82.

¹¹ <https://cedars.sound-data.com/>.

¹² <http://eestats.cpuc.ca.gov/Views/Documents.aspx>.



Program Descriptions and Strategies

In 2018, the IOUs administered a diverse portfolio of EE programs that covered every market sector and customer type, across all technology families. IOUs used a variety of market intervention strategies from upstream rebates—targeted at manufacturers and distributors to buy-down the cost of the product for the end-use customer—to midstream and downstream incentives. These programs supported California’s Long-Term EE Strategic Plan goal to provide customers with a more integrated EE experience, access to information, and greater financing opportunities.

Covering 70,000 square miles in Northern and Central California, and serving approximately 16 million people, or five percent of the United States (U.S.) population, PG&E’s territory and customers are diverse. Over 80 languages are spoken throughout PG&E’s territory, covering rural to urban communities, with a diverse residential, commercial, agricultural, and industrial base. To serve this diverse group of customers, PG&E leverages local partnerships and third-party programs to serve targeted and niche markets, harder-to-reach segments, and to focus on customer groups with specific needs.

In 2018, PG&E’s Business Plans for 2018-2025 were approved¹³ and work to transition the EE portfolio towards increasing third-party implementation continued. The CPUC mandated that third-party programs make up at least 25 percent of all EE programs by 2019, 40 percent of all EE programs by 2021, and 60 percent of all EE programs by 2023.¹⁴ The 25 percent third-party portfolio implementation deadline was later extended to December 19, 2019.¹⁵ To meet these mandates, PG&E began to prepare program solicitations. PG&E’s solicitations schedule, resources, and updates can be found on PG&E’s website at: https://www.pge.com/en_US/for-our-business-partners/energy-efficiency-solicitations/energy-efficiency-solicitations.page.

Previous versions of this report had a section dedicated to third-party programs. That content can now be found within each individual sector’s chapter.

This section describes PG&E’s successful strategies and accomplishments for the following program sectors in 2018:

- 1) Residential
- 2) Commercial
- 3) Public
- 4) Industrial
- 5) Agricultural
- 6) Emerging Technologies
- 7) C&S
- 8) Workforce Education and Training
- 9) Financing
- 10) Integrated Demand-Side Management

¹³ D.18-05-041.

¹⁴ D.18-01-004.

¹⁵ D.18-05-041.

Residential Program

PG&E's vision for the Residential sector is to deliver a portfolio that will achieve deep energy savings and robust grid benefits through (1) focused customer engagement, (2) data-driven subprograms that leverage market actors, and (3) strong partnerships.

PG&E's current Residential subprograms offer a robust suite of incentives, services, and tools aimed at helping all customers save energy and money, while meeting portfolio goals.

Current subprograms engage customers and other market actors through the following channels:

- Built environments such as whole home upgrades, Heating, Ventilation and Air Conditioning (HVAC), and new construction,
- Engaging retailers and manufacturers on more efficient plug loads and appliances,
- Offering behavioral and home energy management tools and initiatives.

Key Initiatives

PG&E's Residential Program priorities described below are based on overall program objectives and energy savings goals.

Residential Pay for Performance (P4P)

In 2018, PG&E launched its first residential NMEC program, the Residential P4P Program. P4P employs energy meter data for customers targeting to deepen energy savings and ensure subprograms drive grid benefits. This program aims to achieve PG&E's goals of establishing savings persistence and on-going relationships between PG&E and customers. P4P is expected to drive innovative solutions for resource planning and use of CalTRACK Methods,¹⁶ a newly established code used to calculate avoided energy use, to focus on locational demand impacts of EE.

PG&E's Key Residential Program Goals

- Deliver residential EE programs that are leveraged as a grid resource
- Make EE accessible through programs and financing offerings
- Increase access to and use of energy use data
- Support state policy objectives around RNC
- Transform markets to create EE opportunities for customers



¹⁶ <http://www.caltrack.org/>.



Disadvantaged Communities (DAC)

PG&E continued to work closely with internal and external stakeholders to ensure Residential EE subprograms support all Californians. PG&E maintained an increased focus and funding for the multifamily subprogram offerings, Direct Install (DI) subprograms for moderate-income and hard-to-reach customers, and mobile and manufactured homes. The Moderate Income Direct Install (MIDI) subprogram expanded service to all renters and non-native English speakers. The subprogram works closely with local governments and is coordinated with the Residential Energy Fitness Program (REFP).

Maintaining the commitment to provide multifamily customer access to PG&E's energy resources, PG&E continued coordination with an independent Multifamily Single Point of Contact (SPOC). The SPOC coordinates EE incentive programs, OBF, income qualified, and other energy resources such as Demand Response (DR), Distributed Generation (DG), Rate Options, and Electric Vehicles for multifamily building owners.

Energy Star Retail Products Platform (ESRPP)

Working closely with Environmental Protection Agency (EPA) ENERGY STAR® staff and fourteen program administrators nationwide, PG&E's Residential Program team led a national expansion of the ESRPP pilot in 2018. ESRPP is a strategic market transformation effort designed to create long-lasting, sustainable changes in the functioning of product-specific markets by reducing market barriers to the adoption of EE plug-load and appliances. ESRPP focuses on addressing the growing number of small plug-loads on the market through a midstream incentive to retailers.

In 2018, the ESRPP initiative reached 18 percent of the U.S. consumer market with participation from major retail chains and a national retail buying group for plug-loads and appliances. In 2018, PG&E contracted EMI Consulting to conduct the first evaluation of this new program concept.¹⁷ The evaluation results indicated that the activities outlined by the program have been successfully implemented, including the payment of incentives to retailers and the subsequent collection and tracking of sales data, key components of this effort.

Opportunities Moving Forward

As solicitations continue, PG&E will pursue opportunities to build a dynamic, cost-effective portfolio, and to expand successful programs to serve customers and save energy at increasing scales. PG&E expects that market transformation and pay-for-performance programs, alongside OBF, will be the foundations of a successful residential program offering.

¹⁷ Pacific Gas and Electric Energy Star Retail Products Platform (ESRPP) Program Pilot Early Evaluation, January 18, 2019.
<https://pda.energydataweb.com/api/view/2128/PGE%20ESRPP%20Eval%20Report%20v5%20optimized.pdf>.



Residential Subprograms

Residential Energy Advisor Subprogram

The Residential Energy Advisor subprogram uses behavioral outreach initiatives and interactive tools, including the Home Energy Report (HER), Home Energy Checkup (HEC), and PG&E Marketplace, to engage customers and encourage participation in innovative energy initiatives. The suite of products and services enable customers to understand and manage their energy use, and where appropriate, be guided to other energy solutions. The HER shows customers how their energy usage changes over time and how their usage compares with similar homes in their area. The HEC is a self-guided online assessment that helps customers understand where they use energy in their homes, provides energy-saving tips and suggestions based on their specific situations, and generates a simple checklist plan saved on a customer's PG&E Your Account website to track their progress as they complete the items on their plan.

2018 Strategies and Successes

By the end of 2018, the HER program reached a lifetime savings of 836 GWh and 27.5 million therms. PG&E focused on the enhancement and expansion of the HER program to create positive energy change to a broader consumer base. PG&E sent customers a personalized mailer showing the customer their home's energy use and how they compare to similar homes in their area. Based on lessons learned from the first waves of personalized mailers, PG&E sent additional mailers to reach over 110,000 new customers in 2018. Currently, 1.5 million customers receive HER. PG&E also began offering email HERs to 650,000 existing HER recipients to complement the mailer and drive deeper engagement in the online channel. In 2018, the PG&E marketing team explored new outreach channels and tactics based on 2017 successes for HEC. This approach led to approximately 147,000 customers completing the HEC in 2018.

PG&E's Marketplace is another tool that helps customers choose more efficient products. Marketplace presents an Energy Score and other energy related features, such as "Clear Cost" or total cost and lifetime energy costs. In 2018, about 230,000 customers visited the Marketplace to research home appliance and consumer electronics. In Q4 2018, the platform vendor started work to comply with Americans with Disabilities Act (ADA) standards for a new release of the site. That work is set to complete during Q2 2019.

Residential Energy Efficiency Subprogram

The Residential Energy Efficiency Program (REEP), previously known as Plug Load and Appliances, aims to transform the market to achieve sustainable adoption of energy-efficient REEP products where ongoing intervention would no longer be required. For the short- to mid-term timeframe where EE REEP products are still not the market's default choices, PG&E uses incentives and industry collaboration to increase availability, awareness, and adoption of energy-efficient products. For the longer-term timeframe, PG&E leverages Integrated Demand-Side Management (IDSMD) programs to influence the development of C&S to ensure minimum required EE levels, promote EE as the preferred lifestyle choice, and promote new product purchases. The subprogram's long-term strategy seeks to create on-going demand for energy-efficient products thus motivating the industry to produce and sell highly energy-efficient REEP products as the market's standard offering.



PG&E offers rebates and incentives to customers who purchase and install high-efficiency appliances and works with other partners to encourage consumers to adopt high-efficiency products and water saving measures. Additionally, PG&E worked with the EPA ENERGY STAR® staff and other utilities to lead the national advancement of ESRPP, a component of PG&E's REEP subprogram. ESRPP is a national market strategic effort to overcome barriers for residential customers to adopt energy-efficient products through a dedicated market transformation subprogram design. This design aims to produce sustainable changes in retail markets for plug-loads and appliances by reducing barriers to the manufacture, distribution, sale, and installation of energy-efficient products.

2018 Strategies and Successes

In 2018, PG&E offered subprograms to residential end-use customers to cover some of the incremental costs of purchasing energy-efficient products. Eligible products included gas water heaters, electric heat pump water heaters (HPWH), variable speed pool pumps and motors, and smart thermostats. Due to high administrative and labor costs and low measure cost-effectiveness, gas water heaters and variable speed pool pumps and motors were sunset in 2018 and will not continue as offerings in 2019.

Marketing of the rebate programs was conducted on a multi-touch, multi-channel level including tactics such as email, digital advertising, and use of PG&E-owned assets such as PG&E's website, residential digital newsletter, and HERs. The REEP subprogram was supported by a field services team who provided salesperson training, point of purchase materials, and in-field support to retail partners. PG&E received applications for the subprogram via mail, online, and at retail point-of-sale.

Advanced Home Upgrade Subprogram

The Advanced Home Upgrade program, previously known as Energy Upgrade California,™ captures large savings potential and helps customers achieve deep energy reductions. Through 2018, PG&E had increased focus on what was known as the Energy Upgrade California™—Advanced Home Upgrade (Advanced Home Upgrade pathway (AHUP)), which works with contractors on comprehensive whole home retrofits. The AHUP was the highest performing segment of the Energy Upgrade California subprogram. PG&E's investment in AHUP, specifically advanced contractor training, enabled the sunset of the underperforming Home Upgrade pathway with minimal impacts to the participating contractor network.

2018 Strategies and Successes

Due to declining effectiveness of the Home Upgrade pathway, PG&E transitioned its focus to the Advanced Home Upgrade component of the program in 2018. PG&E also began restructuring the program to continue to drive savings and remove barriers to customer participation, with expected launch in 2019.

Multifamily Home Upgrade Subprogram

PG&E's Multifamily Home Upgrade subprogram (MUP) promotes long term energy benefits for affordable and market-rate multifamily housing through comprehensive EE upgrades. Historically, owners and managers of multifamily properties have been less responsive to EE efforts than other residential customers. The MUP uses a tiered performance-based approach which allows property owners to make informed decisions on cost-effective measures and maximize savings by conducting an energy audit and offers incentives to offset the cost of the assessment and the improvements. All multifamily customers, regardless of property type (e.g., affordable or market-rate), planned scope, resident income level, and other factors, receive subprogram recommendations unique to their property.



2018 Strategies and Successes

In 2018, MUP expanded program offerings, including free benchmarking for all PG&E multifamily properties to drive AB 802 compliance, and piloting of operations and maintenance (O&M) trainings. These training sessions are tailored to the host site where multiple properties are represented. Attendees complete the training with the ability to implement lessons of safety, troubleshooting and preventative measures. These trainings will continue in 2019.

In 2018, PG&E transitioned subprogram delivery channels to integrate available multifamily services through a single customer service pathway, referred to as the Multifamily SPOC. The SPOC approach removes the customer burden of navigating available subprograms, determining eligibility, and applying to various subprogram opportunities. Through the SPOC, PG&E aims to provide streamlined, personalized, and comprehensive support for multifamily customers to yield savings for low- and middle-income customers, safe indoor air quality, easier to operate buildings, more comfortable homes, and expanded retrofits of multifamily buildings throughout PG&E territory.

Residential New Construction Subprogram

The RNC subprogram consists of the California Advanced Homes Program (CAHP) for single family homes, and PG&E's California New Homes Multifamily third-party subprogram. The CAHP and California New Homes Multifamily subprogram (discussed alongside other residential third-party programs below) work to encourage building and related industries to exceed California's Title 24 EE standards through a combination of education, design assistance, and financial support, and to prepare builders to achieve ZNE by 2020.

2018 Strategies and Successes

The RNC subprograms updated their subprogram structures and designs to better guide participants towards the 2019 Title 24 updates, moving to use of the energy design rating to determine eligibility and base incentive level. The subprogram has also placed an emphasis on advanced building envelope measures by offering cash bonuses for specific measures. These high-performance envelopes ensure the resiliency of the home energy savings for the life of the building.

As part of its Respond, Rebuild, Resilience commitment to meet the challenges of extreme weather resulting from climate change, PG&E began offering doubled new construction EE incentives for customers who lost their homes in the October 2017 Northern California wildfires. These program incentives, known as the AER are an enhancement to the existing CAHP and are intended to help homes that were red-tagged by California Department of Forestry and Fire Protection. PG&E is also collaborating with SCP and the BAAQMD to offer a one-stop shop for residential green building incentives for customers in Sonoma and Mendocino counties who lost their homes to wildfires. This has allowed customers to access incentives being offered from three different organizations with a single application. A similar program is also being offered in collaboration with MCE and BAAQMD within Napa County.

On March 19, 2019, the Commission granted PG&E's supplemental request¹⁸ to provide this support to the victims of the 2018 wildfires, effectively expanding AER offerings to apply to all customers rebuilding a destroyed home or building subject to the 2016 Title 24 code.

¹⁸ PG&E AL 4068-G and 5479-E.



Residential HVAC Subprogram

PG&E's Residential HVAC subprogram is focused on driving EE and peak load reduction from customers' use of air conditioning. The subprogram promotes increased quality levels in the HVAC market for technology, equipment, installation, and maintenance. In addition to working with HVAC contractors on improving HVAC maintenance and installation practices through the AC Quality Care offering, the subprogram also included small-scale pilots of an HVAC distributor incentive subprogram to sell more high-efficiency units. In 2018, the residential HVAC Distributor Incentive Pilot Program was sunset due to low cost-effectiveness.

2018 Strategies and Successes

Residential HVAC Quality Maintenance efforts are increasingly popular among contractors and home owners, resulting in the treatment of over 9,000 HVAC systems. To enhance the quality of service offered through the subprogram, PG&E offers best-in-class technical training to the participating contractors and technicians. In 2018, over 80 technicians were provided training under this initiative. PG&E also implemented subprogram enhancements to improve cost effectiveness and customer satisfaction, including introduction of smart data collection procedures, further strengthening of quality control, optimizing incentive levels, and ensuring the subprogram could serve a greater number of customers.

Primary Lighting Subprogram

The Primary Lighting subprogram offers rebates to manufacturers of light emitting diode (LED) lamps to reduce the cost of high-quality and energy-efficient lighting products. Since 2014, all incentives provided for LED measures in PG&E's Primary Lighting subprogram have been devoted to products that meet or exceed the California Energy Commission's (CEC) Quality LED Lamp Specification. The last several iterations of the CEC-spec have aligned directly with future Title 20 code changes. This has enabled Primary Lighting to directly support advancements of California C&S.

2018 Strategies and Successes

PG&E's focus in the Primary Lighting subprogram has been to increase manufacturer participation and to prepare the manufacturers for upcoming code changes. Every year since 2014, PG&E has increased the number of manufacturer partnerships; in 2018, PG&E had 14 manufacturers participating in the program. This approach ensures that the subprogram is supporting Code Readiness (CR) across as much of the market as possible. 2018 also marked the fifth full year of solely supporting LED lamps that met the new advanced LED specification as designed by the CEC. The program required the products to comply with more stringent Tier II CEC specifications in addition to the ENERGY STAR compliance.



Residential Third-Party Program

PG&E's Residential Third-party Programs are an integral component of its overall Residential sector strategy to help provide customers with energy-efficient solutions and services.

Energy Fitness & Moderate Income Direct Install Subprograms

Implementer: Richard Heath & Associates, Inc. (RHA)

The REFP was selected through an innovative solicitation conducted in 2015. Key components include enhanced methods to target customers and deliver customer education. This DI subprogram includes energy education, in-home assessment, installation of no cost and low-cost measures, and ongoing education to monitor energy usage after participating in the subprogram. The subprogram was launched in June 2016 and assisted targeted customers with EE upgrades, improving existing heating and air conditioner efficiency through duct sealing, efficient motors and fan controls, EnergyStar certified Smart Thermostats and refrigerant charge adjustment, among others.

In 2018, the MIDI program - also administered by RHA - was significantly expanded to extend the subprogram offering to all renters and non-native English-speaking customers. This extension followed the 2017 MIDI relaunch, where the offering was expanded to serve moderate-income residents up to 400 percent of the Federal Income Guidelines across the PG&E territory, with an increased range of no-cost measures. Measures include EnergyStar certified Smart Thermostats, Tier II Smart Power Strips, LED lighting, low flow showerheads and faucet aerators, and products and services to increase the efficiency of air conditioner units. Ongoing customer education and reporting is also offered through the subprogram utilizing a similar monitoring service as REFP above. The expansion serves single and multifamily renters and owners across PG&E service territory, allowing for increased focus on hard-to-reach customers and members of DACs.

2018 Strategies and Successes

In 2018, both REFP and MIDI began offering EnergyStar certified Smart Thermostats at no cost to participating customers, providing customers with more healthy, efficient, and comfortable homes. Both subprograms also explored options for offering a more IDSM service. REFP began coordinated marketing campaigns to inform High-Use Surcharge customers of their no-cost EE services, and both subprograms began evaluating the ability to offer time-of-use (TOU) rates coaching via customer education and in-home assessment sessions.

California Multifamily New Homes Subprogram

Implementer: TRC

The California Multi-Family New Homes (CMFNH) subprogram provides comprehensive support for saving energy in the RNC sector with a cross-cutting focus on sustainable design and construction, green building practices, EE, and Emerging Technologies (ET). Through a combination of education, design assistance, and financial support, the California New Homes Multifamily subprogram encourages building and related industries to exceed California's Title 24 standards and prepare builders for future changes to these standards.

2018 Strategies and Successes

In 2018, TRC's implementation team enrolled a growing number of Multifamily New Homes projects and worked with local municipalities, like Berkeley and Fremont, to better promote the offerings and develop leads.

Enhanced Time Delay Relay Subprogram

Implementer: Proctor Engineering

The Enhanced Time Delay Relay subprogram (also known as the Cooling Optimizer subprogram) is a DI subprogram serving multifamily residential customers in targeted climate zones. To advance awareness in this hard-to-reach segment, this subprogram serves multifamily customers and is designed to address the unique EE challenges presented in property management-owned and tenant-occupied buildings. The subprogram offers property managers a no cost tune-up, fan delay relay installation, high-efficiency BPM fan motor installation, as well as incentives for establishing a maintenance contract. This focus on maintaining a properly tuned air conditioner can improve tenant comfort and reduce their energy bills. In partnership with Enovative Group, Inc., the subprogram also offers an on-demand recirculation pump control for multifamily buildings with central water heating. Demand-based controls can reduce recirculation pump run time and provides equipment life and maintenance benefits.

2018 Strategies and Successes

In 2018, the Energy Star Certified smart thermostat was added as a new offering in the subprogram to help customers better manage heating and cooling energy use and the upcoming residential TOU transition.

Direct Install for Manufactured and Mobile Homes Subprogram

Implementer: Synergy Companies

The DI for Manufactured and Mobile Homes subprogram is a direct installation, no-cost-to-the-customer subprogram that serves the hard-to-reach residents of manufactured homes and mobile home parks. It also targets a variety of non-English speaking customers. The subprogram improves the efficiency of air conditioners by providing air conditioning tune-up and refrigerant charge adjustment, fan controls to save energy by running the fan at the end of the compressor cycle, and high-efficiency blower motor upgrades. The subprogram also offers installation of Tier II Smart Power Strips and ENERGY STAR® rated products including lighting, low flow showerheads, and aerators. The program also offers duct test and seal measures to the customers to reduce duct leakage and improve overall efficiency of the heating and cooling systems.

2018 Strategies and Successes

In 2018, the program began offering Energy Star certified Smart Thermostats. Ducting systems were observed to often be very inefficient and beyond repair for mobile and manufactured homes. These systems are hardly replaced and are in service much beyond their expected life. To address this, the program added a duct replacement measure in 2018. Replacing these ailing ducts with new ducts not only improves the efficiency of the ducting system but also provides Improved Air Quality benefits to the occupants.

Residential Pay for Performance (P4P) Subprogram

Implementers: Franklin Energy, ICF, Home Energy Analytics, and Build it Green

PG&E began offering the Residential P4P pilot subprogram to customers in 2017. The P4P model enables measurement of energy savings at the meter and aims to achieve persistent savings through an ongoing relationship between customers and their contractors. The subprogram uses CalTRACK Methods to track the time and locational demand impacts of EE. By leveraging these methods, the subprogram is operationalizing feedback to drive continuous improvement in program performance. Using energy meter data, the subprogram opens new possibilities to integrate demand flexibility into resource planning and to transform EE into a reliable grid resource.



2018 Strategies and Successes

In 2018, the subprogram signed contracts with two new program implementers, each offering a diverse suite of energy savings solutions to participating customers. P4P also engaged in a collaborative process to complete CalTRACK Version 2 Methods, finalizing the Methods alongside Energy Division, CEC, the other California IOUs, and other California and national stakeholders. This work will contribute to the PG&E Business Plan goal of realizing P4P program savings at scale.

Commercial Program

PG&E's Commercial EE program offers commercial customers a suite of products and services to help overcome the market barriers to optimize energy management. The program targets integrated energy management solutions—including EE, DR, and DG—through strategic energy planning support; technical support services such as facility audits and calculation or design assistance; and financial support through rebates, incentives, and financing options.

PG&E's Commercial EE program is moving toward the Commercial Business Plan goal of ramping down the proportion of rebate and incentive funds to drive EE in favor of in-house and publicly available finance options. OBF offers a strong solution to address 'first cost' barriers which affect project decisions. In 2018, OBF focused on EE savings without deemed or custom measures and, based on site energy savings, allows a broader adoption of EE strategies across building technologies without the restrictions that paid incentive measures sometimes require.

As stated in the Business Plan, PG&E's vision centers on empowering large and Small and Medium-sized Business (SMB) customers to better understand, manage, and eliminate unnecessary energy use. PG&E is gearing up for the future of EE that includes a greater involvement in third-party-designed subprograms. In 2018, PG&E began soliciting and reviewing third-party designed programs that encourage data and market driven solutions for this segment of customers. Prominent among these responses are meter-based approaches which encourage more comprehensive and persistent EE strategies for customers of all sizes and types. The Commercial EE portfolio will be redefined to meet the needs of the EE marketplace. PG&E looks forward to helping California achieve future energy savings and climate goals.

2018 Strategies and Successes

PG&E focused on transformative strategies in 2018 to position its subprograms to achieve PG&E's vision for the Commercial sector: putting commercial buildings on a path to ZNE by 2030 for all new buildings and half of existing buildings.

While still a large focus for savings, momentum in customer acceptance and market transformation to LED lighting technologies has allowed PG&E programs to focus proactive efforts on HVAC and refrigeration, the other prominent targets for energy savings. Each of these trends lend themselves well to automated controls which move customer facilities toward management of the interactive effects of building systems and environmental effects on the road to ZNE compliance. Programs such as Commercial HVAC target not only acquisition of new energy efficient system components, but maximize efficiency of existing equipment with additional controls, as well as proper upkeep through the C-QM program. The comprehensive nature of this approach helps to ensure the likelihood of an efficient customer strategy and results in persistent savings. It also supports and reinforces the direction toward meter-based Commercial Whole Building efforts deploying in 2019.



The Commercial Program allows customers to install equipment and systems that are more efficient than they would install without the program. In addition, customer confidence in the persistence of their savings is increased by the program's commitment to installing high-quality, reliable, cost-effective measures.



In 2018, PG&E engaged and trained contractors, trade professionals, building engineers, design teams, energy service companies (ESCO), manufacturers, retailers, and distributors to prepare this workforce for the future of EE projects. These efforts have resulted in diversified offerings for some and partnership for others as single technology and measure solutions become less compelling when compared to available interactive control approaches. Efforts also continued to improve customer abilities to find qualified contractors and to maintain contractor training levels with interactive and on-demand electronic tools.

In addition to technology driven EE projects, all commercial programs made strides in providing OBF as a primary lever to motivate customers to act. This approach was successful with customers of all types and mastered by contractors and program implementers alike. Financing pairs immediate benefits with the future savings from EE projects, and was a key element of the offering's success amongst commercial customers. OBF doubled the number of participating customers and tripled the number of contractors offering this first cost solution. This cash flow/energy savings solution success will help to move PG&E toward the business plan goal of reduced prescriptive rebates and incentives toward this more cost-effective solution.

Opportunities Moving Forward

PG&E will continue its efforts to advance the state's policy goals and place PG&E's customers on the path to deep and persistent energy savings. This includes an emphasis on data analytics for enhanced customer targeting, technical assistance and tools, new financial solutions, and developing new subprogram models for metered-based savings.

Many of the proposals PG&E has received from the 2018 third-party program solicitations have included meter-based strategies and data analytics to target customers. PG&E's exploration of both internal and external data analysis initiatives yielded customer modeling and propensity data which can be used to identify potential participants for existing programs and those selected through solicitations for the future portfolio. This convergence of data resources with implementers ready to put them to use strongly supports PG&E's Business Plan goal to leverage focused data analytics to reduce program costs and customer interactive bill reduction.

The goal of commercial program outsourcing with market designed programs is to develop a robust system of programs, supply chain, and contractors serving PG&E customers. 2019 goals include providing a streamlined EE product and qualified installation provider referral system, which will empower customers to efficiently engage in cost reduction projects.

Serving Our Customers

Through its Third-party Program channel, PG&E offers commercial customers a suite of targeted, niche program offerings designed specifically to meet them on their energy journey.

In 2018, third-party programs targeted SMBs, hospitality, hospitals, grocery stores, and focused on a variety of technologies including HVAC and advanced LEDs. Additional details may be found in the Third-party Programs section of this report.



Commercial Subprograms

Commercial Calculated Incentives Subprogram

The Calculated subprogram provides financial incentives for non-residential customers to install new equipment or systems that exceed applicable code and/or industry standards in existing buildings. PG&E's Calculated subprogram includes both customized incentives (formerly "Customized Retrofit") and retrocommissioning (RCx) offerings. RCx represents an important element of PG&E's EE toolkit by reducing energy usage and optimizing the efficiency of mechanical equipment, lighting, and control systems to current standards in existing facilities. PG&E offers financial and technical assistance for customers to undertake RCx projects and implement measures that improve facility operations.

Customized New Construction (CNC) has been a subset of the Calculated offering since 2015. CNC serves the Commercial new construction segment for projects requiring more customized calculations, such as spaces with an Industry Standard Practice (ISP) baseline rather than Title 24 (e.g., biotech buildings).

2018 Strategies and Successes

The CNC and RCx offerings paid incentives for 63 and 14 projects, respectively. PG&E has been working to improve its delivery of custom subprograms, leveraging lessons learned and best practices from ex ante review guidance. PG&E developed specific trainings for its engineering teams, program managers, and third-party vendors. These trainings help align the team on policy, baselines, measures, reports, calculation tools, and methods. PG&E also established more rigorous quality control among its technical reviewers, focused specifically on reporting quality and subprogram compliance, and has also undertaken a process review to ensure continuous improvement in customized workflow.

Savings by Design (SBD) Subprogram

The SBD subprogram serves the Commercial new construction segment by promoting integrated design through owner incentives, design team incentives, and design assistance to participants. The purpose of the subprogram is to influence and encourage customers to design and build commercial buildings above and beyond what is required by California's Title 24 standards. The minimum requirement to participate in the subprogram is 10 percent greater EE than Title 24 standards.

2018 Strategies and Successes

PG&E supported 25 projects in the SBD subprogram in 2018, despite some significant challenges with the primary modeling tool for these projects. During the period in which the tool was unavailable, the SBD team identified and communicated to project stakeholders to retain those projects for completion in 2019 and beyond. PG&E worked diligently with other IOUs and the software developer to revise the tool in compliance with CEC staff direction.

The whole building path continued to be a focus for the SBD subprogram in 2018, while system-based projects also provided savings contributions. The PG&E SBD team has been leading a collaborative effort with the other IOUs to prepare the subprogram for a statewide third-party solicitation. PG&E recognizes the current number of SBD projects in progress and is focusing on serving those customer commitments as well as preparing the commercial new construction market for new subprogram design.



The SBD subprogram will continue to work with ZNE and C&S stakeholders to align efforts for future subprogram design strategies.

Commercial Deemed Incentives Subprogram

The Commercial Deemed Incentives (Deemed) subprogram offers prescriptive rebates directly to customers, vendors, or distributors for the installation or sale of energy-efficient equipment. The subprogram offers a broad array of measures across technology segments including lighting, HVAC, food service, refrigeration, and water heating.

2018 Strategies and Successes

PG&E began shifting focus and marketing of the Commercial Deemed subprogram in 2018 to non-lighting EE measures, as lighting rebates and incentives levels continue to decline as performance requirements continue to rise. This diversification helped to provide a broader delivery of EE measure types and attracted new contractors and participants to the program. The message of diversification supports a whole building approach and was delivered by PG&E account representatives, Trade Professional Managers, and third-party program implementers. While lighting savings still comprised the majority of savings, HVAC controls and food service equipment continued their upward trend in contribution.

Increased marketing and focus on food service opportunities and pipe insulation projects helped to drive additional therms savings, while successful recruitment of ozone laundry contractors added to the therms totals and established a strong presence in the program in 2018. Water heater and boiler programs continued to outperform yearly targets for savings through the mid-stream channel. The Deemed Commercial subprogram maintained its applicability to all commercial customer segments including small, medium, and large commercial customers, and the launch and socialization of an online E-Rebates platform helped contribute to the self-service nature of a substantial portion of this program.

Commercial Direct Install Subprograms

PG&E's Commercial DI offerings are administered through its Government and Community Partnership (GCP) program. These DI subprograms provide SMB customers with the opportunity to have a third-party contractor retrofit existing systems with energy-efficient equipment at low or no cost to the customer. Because many SMB customers have short term leases and a split-incentive barrier (in which the customer does not own the equipment that they pay bills for), these subprograms are an effective way to address the needs of this sector and overcome the barriers of limited capital, expertise, and understanding of EE benefits. For more information about PG&E's successes in DI, please see the GCP program descriptions in the Public Sector chapter of this report.



Commercial HVAC Subprogram

The Commercial HVAC subprogram delivers a comprehensive set of midstream and upstream strategies that builds on existing subprogram, education, and marketing efforts, and leverages relationships within the HVAC industry to foster a sustainable, quality-driven market. PG&E also participates in the Western HVAC Performance Alliance (WHPA), a leading organization setting standards and promoting energy efficient HVAC in California.

2018 Strategies and Successes

The Commercial HVAC subprogram is composed of two elements that enable market transformation, direct energy savings, and demand reductions: Upstream HVAC Equipment Incentives and midstream Commercial Quality Maintenance (C-QM). The Upstream HVAC subprogram has received positive feedback as one of the most successfully launched EE subprograms over the last 10 years.

Upstream HVAC Equipment Incentives

This subprogram element offers incentives to distributors who sell qualifying high-efficiency commercial HVAC equipment to increase the stocking and promotion of this equipment. As many of the sales of these products are determined by what is available, this strategy ensures customers have the choice of energy efficient products when the need arises.

2018 Strategies and Successes

In 2018, PG&E promoted the Commercial HVAC subprogram to distributors which currently participate and also specifically targeted areas where distributor participation was low and potential was high. This resulted in the recruitment of strong distributor participants in the central valley and northern regions of PG&E's customer base. PG&E continues to evaluate new technologies and associated equipment categories for the subprogram—such as those with higher tiers for packaged equipment to achieve greater savings and move the market toward higher efficiency units—and engages in statewide collaboration to share best practices across IOUs for subprogram design and training. For the future, new technologies (for example, the Variable Refrigerant Flow (VRF) test described below) and HVAC building controls are also being assessed for inclusion into this subprogram.

Commercial Quality Maintenance

C-QM focuses on commercial maintenance practices to ensure equipment is serviced in accordance with industry standards. It seeks to transform Commercial HVAC maintenance from a commodity-based industry to a quality-based industry. This subprogram has had a significant effect on existing systems' EE performance on an ongoing basis, as described in further detail below.

PG&E Acts as a Leading Voice in Evolving and Implementing Transformative HVAC Programs

As Program Administrators and active members of the Council of Advisors and the Executive Committee of the WHPA, PG&E's Residential and Commercial EE experts are collaborating with a broad group of HVAC industry stakeholders, EE professionals, facility and property management organizations, researchers, educators, utilities, and regulatory agencies to champion HVAC policies to curb energy waste throughout California and the Western region. The WHPA is currently working on updates to the CA EE Strategic Plan to ensure more comprehensive integration of IDSM strategies and Existing Building EE Action Plan objectives.



2018 Strategies and Successes

In 2018, 384 new units were introduced into the C-QM program, bringing the total to 3,134, up 14 percent from 2017. This HVAC program provides incentives for system assessment, system optimization, and continued rooftop unit maintenance based on American National Standards Institute (ANSI), American Society of Heating, Refrigerating, Air Conditioning Engineers (ASHRAE), and Air Conditioning Contractors of America Standard 180. PG&E conducted 12 training sessions for commercial contractors on advanced diagnostics and other quality maintenance practices to ensure participating contractors and technicians have the skills necessary to assess, maintain, and optimize systems per industry standards. Thirty-seven contractors are certified on the subprogram specific requirements, and the 2019 goal is to certify an additional 50 contractors. Rigorous oversight of technician work and random third-party audits ensure HVAC maintenance is fully compliant with highest industry standards. In addition to the increased quality maintenance of enrolled equipment, the program also drives additional EE upgrade measures. In 2018, 275 units were upgraded to advanced rooftop controls, the majority being economizer controls which were integrated into the building management systems.

Through this subprogram, PG&E also supported commercial contractors with marketing materials and outreach efforts to educate customers on the value of quality maintenance and using licensed and certified technicians. PG&E participates in monthly WHPA subcommittee meetings, discussing input and feedback regarding improvement to the C-QM initiative.

Commercial Third-Party Programs

Commercial third-party subprograms offer a turnkey approach that continues to deliver savings, serve customer needs, and remains innovative by adapting to changing market needs. PG&E offers a variety of Commercial third-party subprograms that span various market segments, targeting many of PG&E's harder-to-reach customers. In 2018, the program implementers in the commercial sector delivered substantial additional savings through an expansion of scope which helped them to fill gaps left from sunset market-specific programs. Each of the programs successfully employed OBF as a tool to close projects and capture savings.

Energy Smart Grocer Subprogram

Implementer: CLEAResult

The Energy Smart Grocer subprogram provides comprehensive EE services for medium to large grocery stores and supermarkets in the PG&E service territory. The subprogram provides comprehensive energy audits, long-term energy planning, and support for the implementation of efficiency measures.

2018 Strategies and Successes

The subprogram has successfully partnered with PG&E account representatives to leverage PG&E's OBF program to implement large-scale and complex retrofit projects delivering deeper savings. The increase in projects in grocery and the expansion of scope enabled this program to deliver 40 percent more savings than initial 2018 goals, with almost 6 net GWh using OBF to commit projects. This program also built a strong lineup of projects for 2019 in non-lighting HVAC and refrigeration measures.



LED Accelerator (LEDA) Subprogram

Implementer: Energy Solutions

LEDA encouraged large commercial retail customers to install best-in-class LEDs with the goal of increasing the quality of LEDs offered to the broader market over time. The subprogram offered three tiers of equipment specifications and incentives, helping create a market for manufacturers' best-in-class products and enabling customers to overcome cost barriers associated with more expensive offerings. As sales volumes of the best-in-class products increase, the associated product costs decrease, and products with higher efficacy and better light quality become readily available to the general market.

2018 Strategies and Successes

LEDA provided technical services including audits, LED product selection, pilot demonstration, economic analysis for decision making, financing assistance, monitoring, and application support. Specific strategies for successful projects included:

- Informing customers about innovative LEDs and encouraging the installation of higher quality EE products than originally specified.
- Establishing compelling proposals, including financial incentives and project financials, for decision makers to move forward on projects.
- Conducting post-audits to ensure more accurate energy results and implementing a robust quality assistance and quality control subprogram

However, due to strong market adoption of LED lighting and advanced controls as standard industry practice, the LEDA subprogram sunset at the end of 2018.

Hospitality Subprogram

Implementer: Ecology Action

PG&E's Hospitality subprogram offers a comprehensive list of EE measures and services specifically designed to meet the complex needs of the hospitality market, offering both custom and deemed measure, and assisting customers with EE projects from start to finish.

2018 Strategies and Successes

Existing relationships built from past years of program operation allowed this subprogram to continue work with these customers on multiple projects throughout 2018. Strong focus on identifying the decision makers of chain customers enabled this program to build on past success with lighting projects to obtain commitments on other building system EE projects. Expansion of scope helped this program contribute 30 percent more savings than its 2018 goal and 248 OBF applications in 2018.

Healthcare Energy Efficiency Subprogram

Implementer: Willdan

The Healthcare Energy Efficiency Program (HEEP) provides hospital facilities (medical office buildings and acute care facilities) with a wide range of support services to address barriers to EE. HEEP delivers electric and gas savings through retrofits (deemed and calculated) and RCx services.

2018 Strategies and Successes

The Healthcare EE subprogram had success in HVAC deemed and custom measures, as well as deemed lighting measures, delivering a total of 12 paid projects in 2018. This savings contribution included six OBF projects and included both large and small medical facilities in its performance. Program implementer Willdan has a strong background in HVAC projects, positioning it well for the shift in program focus to mechanical systems and controls for future projects. The HEEP subprogram will continue to target large healthcare facilities. Willdan will use its experience with Office of Statewide Health Planning and Development requirements to deliver customers with targeted value propositions.

Energize Schools Subprogram (IDEEA 365)

Implementer: Strategic Energy Innovations (SEI)

Energize Schools¹⁹ is a non-resource subprogram to assist K-8 schools in planning for and implementing Proposition 39 energy projects while educating students and teachers in energy conservation and efficiency.

2018 Strategies and Successes

In 2018, Energize Schools focused on ensuring implementation of Proposition 39 projects with the assistance of Climate Corps Fellows placed at the Marin County Office of Education and San Rafael City Schools. They served in project and energy manager roles and achieved monetary and energy savings for their schools over their 10-month placements.

Energize Schools held the annual energy conservation competitions throughout PG&E service territory in the spring of 2018 with 24 schools participating and the fall of 2018 with 48 schools participating. An impressive 55 schools managed to compete in both the longer duration (10 week) spring competition as well as the shorter fall competition for increased savings over the year. Students learned about energy conservation through their classes and conserved over 144,782 kilowatt-hours (kWh) throughout the two competitions. SEI also provided teachers with over 150 curriculum products to continue energy and sustainability education after the competitions.

School Energy Efficiency Subprogram

Implementer: CLEAResult

The School Energy Efficiency (SEE) subprogram helps K-12 public schools and their contractors identify, evaluate, and implement EE retrofit measures through technical analysis, measure prioritization, and engineering support.

2018 Strategies and Successes

The SEE subprogram is structured as a technical assistance and support subprogram to identify projects and see them through by working alongside the customer. This structure enables the SEE subprogram to work with the school district without triggering the construction, bidding, and wage requirements of California public school districts. In 2018, SEE was successful in assisting schools with re-working Energy Expenditure Plans (EEPs) to unlock maximum funding for EE projects.

¹⁹ This effort is separate from the Workforce Education and Training (WE&T) Energize Schools effort, discussed in the WE&T Programs chapter of this report. The third-party effort described here serves K-8 students, while the effort described in the WE&T chapter is a high school education program that also funded a 9-12th grade energy competition.

Public Program

PG&E's GCPs team administers the programs serving the public sector. These partnerships with governments help to shape EE and sustainability at the local, regional, and statewide level by meeting the needs of local and state government, and educational institutions. It offers comprehensive solutions that are flexible, innovative, and a reflection of the communities' needs.

PG&E administers 22 Local Government Partnership (LGP) programs, as well as four Institutional Statewide Partnership programs with California Community Colleges (CCC), University of California/California State University (UC/CSU), the State of California, and the California Department of Corrections and Rehabilitation (CDCR). PG&E also supports K-12 public schools and offers an LED streetlights subprogram serving public sector customers.

While classified as public programs, LGP programs, branded as "Energy Watch", are PG&E's primary vehicle for serving commercial SMB. LGP programs consists of lead local partners (LLP) and third-party implementers. The LLPs are local governments or entities that have relationships with local governments. LLPs are generally focused on promoting EE within local government facilities and helping local governments implement California's Long-Term EE Strategic Plan objectives. The third-party implementers concentrate on resource acquisition activities that directly procure energy savings, mainly centered around SMB customers that are hard-to-reach and/or in DACs. Each individual Energy Watch program is described in detail in the LGP section below.

Key Initiatives

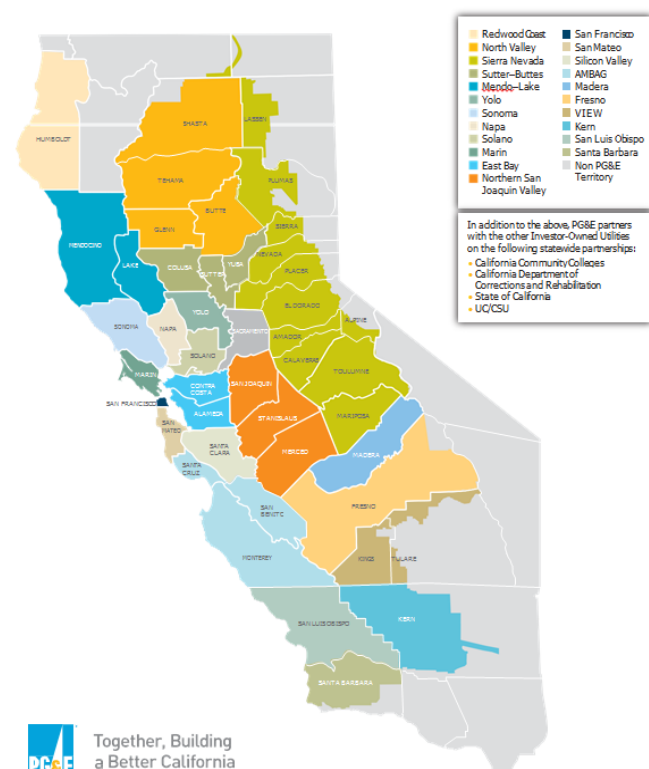
Regional Direct Install

In 2018, PG&E continued significant enhancements to its Regional DI offering, the main driver of energy savings in LGP programs, serving SMB customers under 200 kilowatt (kW) in demand. Regional DI is offered through the LGP programs by eight implementers that cover PG&E's entire service territory. While the implementers vary depending on geography, the program offering is directed by a consistent set of program policies and guidelines, including the alignment of customer incentives.

Hard-to-Reach Communities

Enhanced incentive for Hard-to-Reach customers continued in 2018 and helped ensure under-served SMB customers could continue to participate in these energy saving programs.

Government and Community Partnerships 2018





Cost-Effectiveness

In pursuit of improving cost-effectiveness of LGP programs and meeting the third-party portfolio implementation goals as directed by the Commission, PG&E worked with LLPs and third-party implementers to better understand the drivers of cost-effectiveness and how to collectively produce more cost-effective programs. As a result of this engagement, PG&E introduced the concept of separating the resource and non-resource activities within LGP programs. This transition will take place throughout 2019 so that by 2020, LGP programs will be non-resource only.

2018 Strategies and Successes

PG&E focused on delivering energy savings by bringing comprehensive strategies to customers that encounter unique barriers to adopting EE measures, compared to those of larger and better-resourced commercial facilities. Through LGP programs, SMB customers are served by the Regional DI program model, delivering over half of the SMB energy savings achieved by PG&E's EE Portfolio. Underserved small and medium commercial customers typically need additional support in designing and managing EE projects. Regional DI provided participants with a turnkey program offering, project scoping and audits, technical assistance, and financial incentives to enable these customers to pursue EE.

Opportunities Moving Forward

2019 is year of transition for public programs as the solicitations process to bid program implementation to third-parties is underway. The programs serving the public sector will continue through 2019, with increasing attention focused on achieving cost-effective savings. Following the approval of PG&E's EE Business Plan in 2018, PG&E is transitioning away from pursuing the California Long-Term EE Strategic Plan goals and is now orienting program work and offerings towards fulfilling the objectives and metrics of the Business Plan.

Institutional Partnership Programs

Institutional Partnership programs, designed across the four California IOUs, serve agencies of the state of California and state educational institutions. The objective of Institutional Partnerships is to reduce energy usage through facility and equipment improvements and share best practices among state institutions. There were four Institutional Partnership programs in 2018.

Through these programs, IOUs and partners encourage strategies that promote investment in EE through comprehensive resource support and internal capacity-building. Although these existing programs have made progress over the years, energy savings opportunities still exist within state government and higher educational facilities. For example, with California's Executive Order B-18-12 requiring reductions in grid-based electricity purchases (20% by 2018) and aggressive ZNE goals (50% of all new and existing facilities by 2020 and 2025 respectively), the State is well positioned to make significant progress towards reducing energy usage and the overall carbon footprint of its facilities and infrastructure.

PG&E's Institutional Partnership portfolio focused on achieving energy savings and supporting Demand-Side Management (DSM) integration and coordination, which includes improving regulatory coordination, establishing integration procedures, and piloting DSM integration programs.

California Community Colleges (CCC)

The CCCs/IOU EE Partnership advocates, promotes, and supports EE in the California Community College system by leveraging resources from the Community College Districts, the Community College Chancellors Office, the four California IOUs, and the State of California. The CCC/IOU Partnership provided extensive outreach and support services to the districts within the California Community College system in support of their efforts to identify, develop, and implement projects funded through Proposition 39. This unique Partnership achieves common goals for energy use reduction, cost savings, and fostering a more sustainable future.

2018 Strategies and Successes

Partnership support has enabled full Prop 39 program participation from all 72 districts, helping to ensure the success of this important statewide initiative. In 2018, the program continued outreach efforts through participation in the CCC IOU Partnership Management team, and through PG&E participation in various workshops and conference presentations directed toward campus facilities staff. The program focused on meeting campus and IOU annual energy savings goals for 2018 project completion and achievement and supported 12 Fellows as part of Strategic Energy Innovation's Bay Area Climate Corp program. These fellows were placed at campuses across PG&E territory to provide support for energy projects and other sustainability efforts.

University of California and California State Universities (UC/CSU)

The UC/CSU and IOU EE Partnership is a unique, statewide subprogram to achieve immediate and long-term energy savings and peak demand reduction within California's higher education system. The UC/CSU subprogram attributes its success in part to: (1) an engaged management team and executive team that meets regularly to discuss overall subprogram status and policy issues and (2) a Training and Education Team that organizes various EE trainings targeted to university campuses. The IOUs, UC Office of the President, and CSU Chancellor's Office each have members on program management teams. Inclusion of all Partnership stakeholders at the various management levels provides the UC and CSU campuses with support in their efforts to implement EE projects.

2018 Strategies and Successes

In 2018, this partnership continued the framework established in previous program cycles for sustainable, comprehensive energy management at campuses served by the IOUs. Overall, the UC/CSU/Utility Partnership made progress towards the 2018 program cycle goals, completing over 50 Retrofit, monitoring-based commissioning, and New Construction projects at 16 different UC and CSU campuses. The partnership demonstrated many administrative successes in 2018 as well, working with stakeholders to finalize the Public Sector Business Plans and gathering input for the statewide approach to be implemented in 2020. The IOUs continued to develop and implement programs consistent with SB 350, AB 802 and AB 1150 demonstrating measured savings against existing conditions, P4P, and comprehensive whole-building approaches to building efficiency. The UC/CSU Partnership's Training and Education Team continued their scholarship program, granting educational scholarships to UC and CSU energy managers, and organized several successful trainings, webinars, and in-person events focused on a range of topics related to EE.



State of California Partnership

The State of California EE Partnership Program (Partnership) shares best practices and implements EE projects for energy savings and peak demand reduction at state-owned facilities served by the IOUs and other partners.

The Partnership assists state agencies, under the Executive Branch of the state government, to comply with Executive Order S-20-04 (Green Building Initiative). The Partnership also assists the Judicial Council of California (JCC), the administrative division of the Judicial Branch, to achieve their EE goals. This Partnership reduces the amount of energy the state purchases off the electrical grid. This Partnership provides enhanced custom incentives and core programs for projects implemented in California's state owned and leased buildings. Additionally, the IOUs provide services for education and training activities. An objective of the Partnership is to integrate and coordinate various utility subprograms to leverage incentives and encourage customers to expand their focus beyond EE.

Partnership activities achieve cost-effective energy savings through EE, RCx, equipment retrofits, new construction, third-party programs, DR programs, and any applicable self-generation programs. The Partnership also seeks opportunities to integrate utility incentives with financing options. These include state financing through the State of California Department of General Services Golden State Financial Marketplace Program ("GS \$Mart"), the American Recovery and Reinvestment Act (ARRA) Revolving Loan Fund, or PG&E's OBF subprogram to increase participation in the partnership effort and encourage additional energy projects.

2018 Strategies and Successes

The Partnership continued to use the Program Administrative Manager (PAM), a consulting firm that coordinates the subprogram statewide among the four IOUs and institutional customer groups, acquired in 2016, to assist with subprogram implementation. The Partnership also participates in and provides education and training material at monthly Sustainable Building Working Group (SWBG) meetings. The SWBG is a collaborative effort between State of California agencies that is focused on identifying and scaling sustainable practices, including EE. In addition, the Partnership met frequently throughout the year. In addition to monthly management team meetings and quarterly executive team meetings, the Partnership instituted monthly project status meetings for both Executive Branch and JCC projects to ensure the Partnership deploys resources in a timely and effective manner.

California Department of Corrections and Rehabilitation

The CDCR/IOU Partnership is a customized statewide EE partnership subprogram that accomplishes immediate, long-term peak energy demand savings, and establishes a permanent framework for sustainable, long-term comprehensive energy management programs at CDCR institutions served by California's four IOUs. This subprogram capitalizes on opportunities for efficiency improvements and applies the resources and expertise of CDCR and IOU staff to ensure a successful and cost-effective subprogram that meets Commission objectives. The subprogram also leverages the existing contractual relationship between CDCR and ESCOs to develop and implement energy projects in CDCR facilities.

CDCR uses over half of the energy consumed by state agencies under the Governor's executive authority; however, CDCR's budget for implementing EE projects is minimal. With the CDCR/IOU EE Partnership, efficiency projects can be identified and implemented through the IOU core and OBF subprograms. OBF has been and remains to be the primary source of funding and, in select instances, is supplemented by either Special Repairs Project funding or GS \$Mart.

2018 Strategies and Successes

In 2018, CDCR continued reactivating retrofit projects that had been put on hold in 2016, performing Investment Grade Audits and scoping out projects. The IOUs and the PAM supported development of the new projects, ensuring that they reached maximum efficiency and incentive potential. To support more project development, the IOUs performed energy audits of a subset of CDCR's facilities, which CDCR is using to prioritize the next wave of projects.

The subprogram undertook an effort to ensure new construction projects and gas-savings water conservation projects were clearly tracked and proactively managed. The IOUs provided ongoing training to the ESCOs around changes to IOU financing options (i.e., enhanced incentives, rebates and OBF) and processes. Regular monthly management team meetings and quarterly executive team meetings have been key to identifying and managing projects, and to proactively addressing any challenges the subprogram may have faced.

Local Government Partnership Programs

PG&E's LGP programs work with local governments to deliver energy services to city and county facilities and their communities. PG&E had 22 LGPs in 2018, serving approximately 238 cities and 44 counties. Through LGPs, PG&E and local and regional partners work together to develop and implement subprograms that serve the public sector and the broader community, including SMB and non-profit customers. Over the past 10 years, PG&E's portfolio of LGPs has grown to cover all of PG&E's service territory. LGPs are the primary delivery channel supporting cities, counties, and other local agencies seeking energy savings and GHG emission reductions on the community-scale. Promoting energy planning at a statewide and local level is a major market driver in increasing the uptake of local government EE projects and extending the reach and effectiveness of PG&E's EE programs. Through LGPs, PG&E leverages the role of local governments to achieve deeper energy savings in both municipal facilities and the broader community as an integral part of other community climate action and sustainability programs.

PG&E LGPs are built around the communities which they serve. While local governments represent most LLPs, many LGPs are led by local economic development groups, associations of governments, joint power authorities, and regional non-profit organizations. These local organizations have missions aligned with supporting the economic, environmental, and societal health of their communities. Local partners are best positioned to understand and identify customers within their communities and effectively partner with subprogram implementers to overcome barriers to EE adoption. Over the past few years, Regional DI subprograms have delivered the majority of SMB downstream energy savings for PG&E's EE portfolio. Through this offering, SMBs benefit from a high level of technical assistance and turnkey installation whereby the incentive payment is incorporated into the project proposal. LGPs also work to meet the targets of the California EE Strategic Plan by implementing EE strategies that support California's larger climate and GHG goals. Strategic Planning activities, also known as Strategic Energy Resources (SER), include energy and climate action planning, green building codes, and benchmarking policies and training. The Statewide Energy Efficiency Collaborative (SEEC) also operates under the SER Program.



Association of Monterey Bay Area Governments Energy Watch

The Association of Monterey Bay Area Governments (AMBAG) Energy Watch is a partnership between AMBAG and PG&E. AMBAG is a Council of Governments led by a 24-member Board of elected officials. The AMBAG Energy Watch region includes Santa Cruz, Monterey, and San Benito Counties, and the 18 incorporated cities within the Monterey Bay Area. AMBAG Energy Watch serves municipal jurisdictions, schools, special district, non-profit, small business, hospitality, and agriculture customers. Services include energy assessments and audits, Prop 39 support, technical assistance, assistance accessing 0 percent OBF or CEC 1 percent financing, benchmarking assistance, development of and assisting with implementation of regional energy action strategies and GHG inventory development. Services provided by AMBAG include technical support, engineering services, and a Regional DI program through Ecology Action. AMBAG Energy Watch also offers a robust public-sector program, providing both turn-key and customized EE solutions for municipal facilities and schools.

2018 Strategies and Successes

In 2018, the AMBAG Energy Watch subprogram continued to support 43 school districts with \$33.3 million of Prop 39 funded EE projects. The subprogram provided school districts with customized EE solutions dependent on the unique needs of the school, and assisted school districts in completing 80 percent of their 5-year project plans and will finish the final installation in 2019. The Year Five installations at the school districts are projected to deliver 1,251,867 kWh in annual energy savings. AMBAG Energy Watch has also worked with its 21 jurisdictions to develop jurisdiction-wide EE LED lighting upgrade projects, to be funded by 0 percent interest OBF. AMBAG Energy Watch developed 10 major jurisdictional projects and got approval and financing to move forward in 2018 for complete installation. These projects are expected to yield a projected 4,101,378 annual kWh savings.

East Bay Energy Watch

East Bay Energy Watch (EBEW) is a partnership between PG&E, local governments, and energy service providers in the East Bay dedicated to providing the most cost-effective EE solutions for residents, businesses, and municipalities throughout Alameda and Contra Costa Counties. The EBEW partnership is guided by EBEW's Strategic Advisory Committee (coordinated by StopWaste), consisting of local government staff spanning across the two counties, with a local government staff co-chair representing each county. Programs provided by EBEW include SMB DI, no-cost residential DI/workforce development, and municipal EE technical support. Program implementers include: DNV GL, Rising Sun Energy Center, and Quantum Energy Services and Technologies (QuEST).

2018 Strategies and Successes

In 2018, EBEW continued to work with StopWaste and Contra Costa County administrators for the Strategic Advisory Committee, which includes more than 20 formally appointed local governments. EBEW partners have experienced great success with the CivicSpark program, which expanded to include Climate Corps Fellows in 2018. Participation in this program continued to grow in 2018, with 16 jurisdictions hosting full time Fellows working on climate action issues in their communities and on EBEW outreach and marketing of the SMB program. In combination with this capacity-building resource, EBEW offered four more activities in 2018: (1) The Your Energy Manager program provided energy support services for SMBs, (2) the innovative HPWH pilot program for residents included contractor outreach and installed 12 water heaters, (3) Green Business Program coordination increased participation in both EBEW and GBP, and (4) a community-based GHG inventory tool was developed for each jurisdiction, measuring GHG reductions with a consistent methodology using 2017 data. Public sector energy savings were addressed by QuEST's support of 11 jurisdictions in multi-year



projects, and Rising Sun visited over 1,700 homes, employing 140 youth, and installing over 18,000 light bulbs and 1,200 smart powerstrips. DNV GL provided energy savings services for lighting and other measures, sending over 3,000 letters to businesses in five cities.

Fresno Energy Watch

Fresno Energy Watch (FEW) is a partnership that provides comprehensive EE services to the City and County of Fresno. FEW is managed by the City of Fresno Department of Sustainability and the Economic Development Corporation serving Fresno County, delivering cost-effective, comprehensive, and persistent energy savings through the leadership of the local government. The goals of the partnership are to provide comprehensive and integrated energy solutions, address community needs, and capture available energy savings. Locally based EE seminars are offered to expand the audience for EE. FEW also focuses on local energy policies that promote EE practices, codes, and standards.

2018 Strategies and Successes

In 2018, FEW focused on assisting municipal customers with prioritization of EE projects, beginning with the installation of energy benchmarking software from Dude Solutions in the City of Fresno. This software allows energy managers to monitor energy use and identify potential areas that need attention. In Fresno County, the program successfully completed a countywide outreach campaign that brought all utility residential and SMB offerings to each of the five supervisor districts. These events were well received by community members and government leaders. As a result, doors were opened to help the program serve these local governments with EE projects in government facilities.

Kern Energy Watch

Kern Energy Watch (KEW) is a cooperative partnership with PG&E, Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas), the County of Kern, and the partner cities within Kern County. The County of Kern is the LLP and works with representatives from local governments throughout the County and other local agencies to provide support for outreach to local government customers. KEW provides assessments and the direct installation of energy saving measures by Staples Energy in qualifying municipal facilities throughout PG&E's service area in Kern County. The partnership also works to encourage the efficient use of energy by providing EE information at community events, by providing public and municipal education and training programs, and audits and financial assistance to municipal customers for the energy-efficient retrofit of municipal facilities.

2018 Strategies and Successes

In 2018, KEW focused on assisting municipal customers to get EE projects started. The key strategy was working with the County's legal team to acquaint them with OBF. 2018 work laid the foundation for greater acceptance of financing opportunities.

Madera Energy Watch

Madera Energy Watch (MEW) is a partnership that offers a range of EE options for commercial, small business, and residential customers, as well as municipal facilities. MEW is implemented by the Madera County Economic Development Commission. MEW works with local contractors, builders, building departments, and others to install energy-efficient equipment to reduce energy use. Locally based training programs are offered to expand the audience for EE. MEW also focuses on local energy policies that promote EE practices and C&S, and delivers cost-effective, comprehensive, and persistent energy savings among local MEW partners. Services provided by MEW include the Third-party and Government Partnership DI program.



2018 Strategies and Successes

In 2018, MEW awarded the third annual Energy Champion award to a local business that embraced EE, using the DI program offered by RHA.

Marin County Energy Watch

Marin County Energy Watch (MCEW) is a partnership between the County of Marin Community Development Agency and PG&E to deliver cost-effective and comprehensive energy savings and incentives to local governments, businesses, schools, residential, nonprofits, and special districts in Marin County. Services are delivered through three channels; The Marin Energy Management Team (MENT) provides energy management services and assessments tailored to suit the unique needs of public agencies, municipal facilities, and schools in Marin County. The SmartLights Program, implemented by Community Energy Services Corporation, provides start-to-finish technical assistance and energy assessments to nonresidential customers for lighting and refrigeration retrofits. MCEW also works with California Youth Energy Services (CYES) to install hardware promoting EE and delivering in-home energy assessments and education to residential owners and renters while providing green jobs for local youth. In addition, MCEW assists cities and the county with climate action planning.

2018 Strategies and Successes

The MENT subprogram focused on assisting school districts with the implementation of Prop 39 plans. Marin has 19 school districts, many of which are smaller and have limited staff, so the MENT program provided valuable services including energy plan revisions, RFP technical specification development and presentations to school boards. The Partnership also worked with the County's public information team to produce two case study videos highlighting EE and financing resources for the business sector which lead to additional interest in the program.

Mendocino-Lake Energy Watch

Mendocino-Lake Energy Watch (MLEW) is a partnership between the Community Development Commission of Mendocino County and PG&E. MLEW offers energy benchmarking services and lighting audits to public municipalities, small businesses, and nonprofits in both Mendocino and Lake Counties. Using a locally-driven approach, MLEW offers these services in one of the more sparsely populated counties in the state. Commercial program elements include a coordinated DI program for lighting and refrigeration, education and outreach, and comprehensive energy audits for public facilities and SMBs. Services provided by MLEW include the Regional DI Program via The Energy Alliance Association (TEAA), a third-party implementer.

2018 Strategies and Successes

In 2018, MLEW continued to support ongoing energy benchmarking of local government facilities. Moving forward, MLEW will be focusing heavily on benchmarking public K-12 schools in the most rural areas of the counties as an introduction of the program to those small communities. This approach should yield additional opportunities in those areas after the local population experiences first-hand benefits at their educational centers.



Napa County Energy Watch

Napa County Energy Watch (NCEW) provides comprehensive EE services to municipalities, nonprofits, special districts, and SMB customers in Napa County. Sustainable Napa County serves as the local subprogram administrator. Services include audits, retrofits, outreach, education, technical assistance, and support for projects. NCEW is positioned to influence energy conservation because of its roots and reputation among municipalities, non-profits, and the vintner community. NCEW supports climate planning by assuring that energy conservation is included in broader sustainability ventures across Napa County. Services provided by NCEW include the Regional DI program by TEAA.

2018 Strategies and Successes

In 2018, NCEW partnered with Napa Valley Vintners and the Napa County Green Business Program to create an energy audit protocol for wineries that set a higher bar for certification than the statewide Green Business Program. NCEW used this higher standard, coupled with water use and waste management criteria to implement comprehensive “Green Winery” evaluations for the wine industry. Results have included significant savings for many wineries post-rate analysis, increased EE project uptake, and increased support for education on O&M measures that can save energy beyond typical rebates. NCEW’s “Green Winery” audits and follow up have been closely coordinated with both TEAA (for DI) and CLEAResult’s Dairy and Winery Industry Efficiency Solutions (DWIES) program. Audit data can also guide future EEM work with wineries across the PG&E service territory, substantially broadening the reach of the County in promoting EE across the board. Because of the improvements used for winery energy audits in the Green Winery program, NCEW began a dialogue with Napa County about creating a similar protocol for the county-wide Green Business program for the broader community of commercial utility customers.

North Valley Energy Watch

North Valley Energy Watch (NVEW) is managed by Northern Rural Communities Development, Inc. (NRCD). NVEW develops, implements, and promotes commercial EE programs in Butte, Shasta, Glenn, and Tehama counties to SMB customers and promotes EE education to residents. In addition to the local governments, NVEW works with local workforce investment boards to leverage existing relationships with SMBs. NRCD’s DI Program is implemented by Richard Heath Associates, a third-party implementer.

2018 Strategies and Successes

In 2018, NVEW continued developing relationships with local agencies and municipalities providing continued educational support, EE planning, and implementation services. Through existing relationships with local governments, NVEW worked with cities and counties to understand unique EE needs, create training programs to meet those needs, and provide technical assistance to special districts around utility cost savings related to utilizing the NRCD’s DI Program. By providing hands-on assistance throughout the process, successful implementation projects were kicked off for four public agencies in Butte County. Building on the success of the “Do-It Yourself” Energy Savings toolkits that have been incorporated into the public library system, NVEW introduced a similar Do It Yourself (DIY) toolkit for middle school STEM curriculum. The school kit curriculum includes information on EE retrofit ideas, self-install products, and resources for information on home energy use. NVEW continues to work with the Workforce Development Board to market EE programs to local jurisdictions and the SMB market.



Northern San Joaquin Valley Energy Watch

Northern San Joaquin Valley Energy Watch (NSJVEW) assists with GHG inventories and climate action planning for jurisdictions in the Central Valley and was implemented by Valley Vision in 2018. NSJVEW offered the Energy Careers Experience Program, which provides paid college student interns to PG&E offices throughout the Central Valley. These interns assisted customers with energy assessments, community outreach, and other EE resources.

2018 Strategies and Successes

In 2018, student interns served local utility offices and Fresno City Hall with well over 1,000 hours of EE work. This work helped PG&E meet EE goals and provided valuable on-the-job experience for area college students. Efforts continued to engage local governments in the three counties served by NSJVEW (Merced, Stanislaus, and San Joaquin).

Redwood Coast Energy Watch

Redwood Coast Energy Watch (RCEW) is a partnership between PG&E and Redwood Coast Energy Authority (RCEA). RCEA is a Joint Powers Authority whose members include the County of Humboldt; the Cities of Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad; and, the Humboldt Bay Municipal Water District. RCEW achieves energy savings through a comprehensive, locally-driven approach in Humboldt County, providing comprehensive energy management services and incentives through three channels: (1) the Small Business DI program offers hard-to-reach, small businesses with turnkey services, as well as project management by a RCEA energy specialist, (2) the Public Agency EE program offers customized services that support EE project identification, scoping, procurement and reporting, and (3) Strategic Energy Resource activities drive long term energy saving opportunities that are addressed through RCEW's resource-based programs.

2018 Strategies and Successes

In 2018, RCEW delivered energy savings through its Small Business EE Program, a Non-Profit EE Program, and a Public Agency EE Program. RCEA's historic commercial, public, and residential programs have been the catalyst for multiple EE, GHG reduction, and renewable energy development projects. RCEA also continued the Public Agency Solar Program with local funding, leveraging LGP funding for EE related support activities while also advancing local generation and storage. RCEW continues to provide a Workforce Development pathway that encourages learning, development, and advancement in California's EE industry.

San Francisco Energy Watch

San Francisco Energy Watch (SFEW) is a partnership between the City and County of San Francisco and PG&E to deliver a broad spectrum of EE measures and savings for businesses and multifamily facilities in San Francisco. SFEW provides comprehensive energy management services and incentives through three channels: (1) the Small Business DI Program offers small businesses turnkey services and project management by a program-assigned contractor, (2) the Commercial Plus and Multi-Family Plus programs use an in-house team of energy auditors but allows for a market-based, vendor-driven pathway to offer property owners and larger businesses technical assistance and energy assessments for installing a wide range of measures, and (3) SFEW also offers larger customers incentives for calculated, nonresidential retrofit projects. SFEW also leverages SER funding for long-term EE planning and bringing innovative solutions to San Francisco customers.



2018 Strategies and Successes

SFEW continued outreach to business organizations and completed or continued numerous campaigns in 2018 focused on the hospitality, office, and retail sectors. SFEW worked closely with PG&E to examine the potential for TLED replacement lamps across all sectors. SFEW also leveraged SER funding to address several areas, yielding increased EE savings. In 2018, SFEW focused on small grocery and restaurants, both as a traditional incentive pathway and through the Comprehensive Maintenance project. Similarly, through the Distribution Shaping project, SFEW used incoming compliance data from the Existing Commercial Buildings Ordinance to seek out building owners with high energy-savings potential, transitioning them into resource-funded EE projects.

San Luis Obispo County Energy Watch

San Luis Obispo County Energy Watch (SLOCEW) is a partnership between PG&E, SoCalGas, the County of San Luis Obispo, the seven incorporated cities within San Luis Obispo County, and participating Community Service Districts (CSD). The County of San Luis Obispo serves as the partnership implementer, providing information and energy management and climate action planning service to municipal customers, and supporting EE services for other local residential and non-residential EE programs including a Regional DI Program.

2018 Strategies and Successes

In 2018, SLOCEW identified high potential projects at CSD facilities based upon the results of PG&E's Large Integrated Audit Program and developed energy benchmarking reports for seven cities with support from CivicSpark Fellows. These reports were used to educate city officials on EE strategies and available resources. SLOCEW continued to assist these cities in developing and implementing EE retrofit projects at their facilities, leveraging partnership technical expertise, rebates, and OBF programs. SLOCEW also updated the County's energy action plan, referred to as the EnergyWise Plan.

San Mateo County Energy Watch

San Mateo County Energy Watch (SMCEW) is a partnership between the City/County Association of Governments of San Mateo County (C/CAG) and PG&E. C/CAG is a Joint Powers Authority consisting of all 20 San Mateo County cities and the County of San Mateo. This enables direct contact across all city and county government levels. SMCEW offers a Regional DI Program, a Customized Engineering Program implemented by Ecology Action, and a middle-income program (MIDI) implemented by El Concilio of San Mateo County. SMCEW partners with Ecology Action and PG&E to identify and drive EE retrofit opportunities, and to build a pool of qualified local contractors who can serve the DI program. SMCEW is also developing an outreach program to partner with PG&E Trade Pros targeting microbusinesses, which are typically difficult to serve cost-effectively through the DI program.



2018 Strategies and Successes

In 2018, SMCEW delivered a comprehensive portfolio of EE services to public agencies, nonprofits, small businesses, schools, and some residential customers, including DI programs for lighting and refrigeration measures, audits, benchmarking, technical assistance for more complex EE projects through PG&E's Customized Retrofit Program, as well as education and training programs. SMCEW released a Call for Municipal EE retrofit projects offering up to \$50,000 for municipalities in San Mateo County to complete EE upgrades at municipal facilities, resulting in \$430,000 in payments to participating municipalities and over 2.3 million kWh in energy savings. SMCEW also hired a consultant to complete a Job Order Contracting Feasibility Study to determine if job ordering could be effective in San Mateo County and worked with contractor DNV GL to update the San Mateo County Energy and Water Strategy for 2025. SMCEW also continued climate action planning efforts and technical assistance with city sustainability staff. Alongside these efforts, SMCEW continued marketing for the program, including monthly newsletters and creation of a completely new website to provide ready information to target customers.

Santa Barbara County Energy Watch

Santa Barbara County Energy Watch (SBCEW) is a partnership between PG&E, SoCalGas, and the Santa Maria Valley Chamber of Commerce. SBCEW covers the northern portion of the county at the southern limit of PG&E's service territory, and serves the municipalities of Buellton, Solvang, Guadalupe, Santa Maria, and the County of Santa Barbara. SBCEW provides assessments and the direct installation of energy saving measures to qualifying businesses and municipal facilities and works to encourage the efficient use of energy by providing EE information at community events and outreach to underserved areas. SBCEW also supports public and municipal training programs, as well as audits and financial assistance to qualifying customers for EE retrofits at their facilities.

2018 Strategies and Successes

In 2018, SBCEW completed EE retrofit projects for 46 SMBs and Municipal customers through the Regional DI program. Additionally, SBCEW reached out directly to residents, businesses, and local governments through targeted outreach, including events and presentations conducted in the city of Guadalupe, and collaborated with SLOCEW and CEC to provide three audit training workshops in Santa Maria for municipal staff and contractors. SBCEW also awarded \$5,000 in grants to non-profit agencies for EE projects, including Good Samaritan Shelter, American Legion, and other non-profits. SBCEW provided collaborative support to the Green Business Program of Santa Barbara County and other agencies that support EE and sustainability. SBCEW also received energy related proclamations and resolutions from the Cities of Santa Maria, Guadalupe, and the County of Santa Barbara, and will continue assisting those local governments with EE resources and programs.

Sierra Nevada Energy Watch

Sierra Nevada Energy Watch (SNEW) is a partnership between PG&E and Sierra Business Council, a non-profit sustainability organization serving the Sierra Nevada region. SNEW's territory is composed of 11 rural Sierra counties, including Lassen, Plumas, Sierra, Nevada, Placer, El Dorado, Amador, Calaveras, Alpine, Tuolumne, and Mariposa, providing innovative EE solutions for local governments and communities through comprehensive, sustained technical services to municipal, nonprofit, and small business customers. SNEW's Commercial Program includes the Energy Watch Tune-Up Program, helping businesses save energy and money by providing a comprehensive energy assessment, delivering money-saving measures, and connecting businesses with other energy saving opportunities. SNEW's Municipal Program assists with benchmarking and energy assessments of government facilities and provides

low-cost EE equipment, as well as climate and energy planning to accelerate EE activities in the community; to date, SNEW has successfully engaged 13 cities and counties in Energy Action Planning activities to help reduce community and municipal energy usage. Services provided by SNEW include the Small Commercial DI Program and the Regional DI Program implemented by Sierra Business Council and starting in the second half of 2018, RHA.

2018 Strategies and Successes

In 2018, the SNEW program worked with 11 public agencies and 97 businesses for a total of 108 customers (78 of which were Hard-to-Reach) to save over 1.5 million kWh through efficiency programs between projects completed by SNEW and passed to the new implementer, RHA. SNEW also worked with two new local governments to prepare Energy Action Plans designed to accelerate EE activities in the community and continued to provide implementation assistance to the 13 jurisdictions who completed Energy Action Planning activities to facilitate working group meetings, assist with outreach events, facilitate Title 24 trainings, benchmark municipal facilities, and assist with Beacon Program applications. Finally, SNEW continued to find success with the Water-Energy Nexus assessment and worked with water agencies providing leak detection training, completing two sets of leak loss detection trainings.

Silicon Valley Energy Watch

The City of San Jose implements the Silicon Valley Energy Watch (SVEW), providing targeted EE education, outreach, energy savings delivery, and overall energy program coordination to 14 jurisdictions in Santa Clara County. SVEW collaborates with PG&E, other local stakeholders, and implementers to augment the success of regional programs through enhanced coordination and outreach and ensure that targeted customers take advantage of EE audits, rebates and OBF financing, benchmarking reports, education and training offerings, and other resources and services. Services provided by SVEW include a Regional DI Program and a Customized Engineering Program implemented by Ecology Action.

2018 Strategies and Successes

In 2018, continued to expand EE retrofit support at schools and submitted five Prop 39 EEPs for local educational agencies (LEA) in the county, awarding seven grants to LEAs. SVEW continued the DIY Home Energy Savings Toolkit program and launched a new Your Energy Savings (YES) pilot program, providing targeted outreach and technical support to microbusinesses. SVEW worked in coordination with PG&E's Small Business Advisor Team and Santa Clara County Green Business Program to generate leads and assist businesses in implementing EE projects, and incorporated strategic outreach to Vietnamese and Spanish-speaking communities in San José to communicate the program offerings. SVEW's primary non-resource activity in 2018 was the Energy Innovation and Climate Action Planning Grant program, with grantee projects in Morgan Hill and Sunnyvale completed in 2018. SVEW continued to support Environmental Sustainability Plan development and implementation for the City of San José, adopting the Plan in February of 2018. SVEW also conducted numerous training across the many diverse sectors in its territory and adopted a local energy and water benchmarking and transparency ordinance in 2018.

Solano Energy Watch

Solano Energy Watch (SEW) provides comprehensive EE services to municipalities, nonprofits, special districts, SMBs, and residential customers. The partnership is led by Solano Economic Development Corporation and leverages civic and business relationships and expertise to serve the community. Services include audits, retrofits, and outreach. Services provided by SEW include the Regional DI Program by TEAA, a third-party implementer, and residential DI with the CYES Program by Rising Sun Energy Center.

2018 Strategies and Successes

SEW promoted EE through the perspective of economic development and strengthening economic viability, and actively engaged with municipal and SMB customers via direct outreach in coordination with TEAA, the DI implementer. In 2018 most of the municipal and SMB customers who were approached by SEW agreed to complete an EE retrofit.

Sonoma County Energy Watch

Sonoma County Energy Watch (SCEW) offers a comprehensive portfolio of EE programs that target municipalities, nonprofits, SMBs, and residential customers. The local administrator, County of Sonoma General Services Department works in partnership with cities throughout the county and other countywide entities to promote a wide-range of programs and initiatives in energy conservation and efficiency, clean energy generation, and environmental programs. SCEW services include the Regional DI Program implemented by TEAA and a residential DI and education program that employs youth energy specialists administered by Rising Sun Energy Center. Additionally, the County also hosts several complimentary programs that are integrated with SCEW outreach and marketing efforts, including the Sonoma County Energy Independence PACE financing program, the Sonoma Green Business certification program, and the BayREN Single Family Residential home upgrade program.

2018 Strategies and Successes

In 2018, SCEW worked closely with PG&E account representatives to identify projects aiming to launch a pilot for future work at county facilities, resulting in several high-profile upgrade opportunities. SCEW is now working with internal facilities staff to identify funding resources to implement these upgrades. After the wildfires in October 2017, the County invested resources to help fire survivors navigate the rebuilding process by connecting them to PG&E services, sponsoring workshops, and dedicating staff time to community outreach and support. This initiative continued throughout 2018 and was met with support and appreciation from program participants. SCEW also employed a CivicSpark AmeriCorps fellow from the Local Government Commission (LGC) in 2018, who further extended marketing and outreach efforts in the community integrated service offerings across programs. This work was accomplished through development of a newly-implemented Salesforce CRM system that tracks participants across programs and identifies opportunities for integrative solutions designed to meet the customers' various needs and offer solutions across funding sources.

Sutter Buttes Energy Watch

Sutter Buttes Energy Watch (SBEW) is a partnership that includes Colusa, Sutter, and Yuba Counties. SBEW's goal is to promote EE and the reduction of GHG emissions in local government operations, concentrating on government facilities and schools and promoting energy-efficient programs. SBEW offers a direct-install program that provides energy-efficient measures to municipal facilities and schools. In addition to the DI program, SBEW raises EE awareness, provides EE training, and offers a Tool Lending Library (TLL).

2018 Strategies and Successes

In 2018, SBEW continued to focus on promoting and developing new relationships within counties, incorporated cities, and government municipalities. By promoting PG&E EE programs, SBEW worked to improve the EE of municipal buildings and support the California Long-Term EE Strategic Plan.



Valley Innovative Energy Watch

Valley Innovative Energy Watch (VIEW) is a unique cooperative partnership between PG&E, SCE, SoCalGas, the County of Kings, the County of Tulare, and the partner cities within these counties. The San Joaquin Valley (SJV) Clean Energy Organization serves as the partnership implementer, providing assessments and the direct installation of energy saving measures in qualifying residences and businesses and benchmarking, audits, and project management assistance for city and county facilities located in the PG&E service area. VIEW also works to encourage the efficient use of energy by providing EE information at community events, public and municipal education and training programs, and financial assistance to municipal customers for the energy-efficient retrofit of municipal facilities.

2018 Strategies and Successes

In 2018, VIEW continued efforts to assist the Partnerships throughout the SJV with benchmarking and EE project development for municipalities. VIEW also continued efforts to partner with County Supervisors to reach out to the small, rural, DACs to assist the residents and businesses in utilizing the EE programs offered by PG&E, SCE, and SoCalGas.

Yolo Energy Watch

Yolo Energy Watch (YEW), is a partnership focused predominantly on municipal facilities and programs, working toward the formation of “Green Teams” and revolving funds to imbed EE in government operations, including staff training and capacity building so that EE, and the pursuit of greater efficiency, is institutionalized and ongoing in the future. Once EE is measured and progress towards goals reported, the jurisdiction will display this progress to the community to demonstrate leadership and encourage and enlist engagement in meeting the jurisdiction’s goals for itself and the broader community.

2018 Strategies and Successes

Recognizing the reality of staffing and funding constraints on developing and implementing plans and policies to promote EE in municipal facilities and programs, YEW arranged for Civic Spark interns to assist with the process; one for the City of Woodland, another for a regional collaboration involving all the jurisdictions. In addition, YEW facilitated the City of Winters in engaging a consultant to begin the climate action planning process, and is participating in the process to update the Yolo County CAP.

Statewide Energy Efficiency Collaborative

The SEEC engages three statewide non-profit organizations and California’s four IOUs. SEEC provides education and tools for climate action planning, venues for peer-to-peer networking, technical assistance and recognition for local agencies that reduce GHG emissions and energy use. SEEC partners include the LGC, the Institute for Local Government, and ICLEI—Local Governments for Sustainability, as well as the Statewide Local Government EE Best Practices Coordinator (BPC). PG&E acts as lead coordinator for ICLEI’s involvement in SEEC.



2018 Strategies and Successes

In 2018, the SEEC Accelerator assisted disadvantaged/low-income (DAC) and rural-hard-to-reach communities. ICLEI, with support from the BPC, developed GHG inventories for Stockton and Fresno and initiated inventories with San Jose, Huron, and Arvin. The Beacon Program added 12 cities, many of them DACs. ILG assisted 142 participants with data requests and documentation of sustainability achievements, including 29 Electricity Savings Spotlight Awards and six Natural Gas Savings Spotlight Awards. LGC coordinated the 9th Annual SEEC Forum in Sacramento, which 95 percent of survey respondents rated as good or extremely good, and 96 percent of survey respondents agreed or strongly agreed that they increased their knowledge and understanding of the issues. The BPC also produced the popular “Weekly Update” that is distributed weekly to over 875 California local government representatives and other stakeholders. The BPC also hosted a monthly local government roundtable on climate action plan implementation and a quarterly roundtable on street lighting EE, providing direct technical assistance in the areas of building energy codes, revolving loan funds, and energy action plan development.

Industrial Program

California's industrial sector is extremely diverse. In most cases, industrial facilities are heavy energy users. Throughout 2018, PG&E focused on EE solutions for its industrial sector customer base to help reduce energy consumption and GHG emissions while increasing customers' profitability by lowering energy costs. The 2018 Industrial EE program partnered with industry stakeholders to promote a comprehensive list of energy management solutions to end-use customers. This suite of program services not only overcomes the traditional market barriers to EE, but also uses efficiency to advance IDSM opportunities such as DR and DG. Key offerings included rebates and incentives for efficient equipment and systems, technical support such as facility audits and energy savings analysis, zero interest project financing, and strategic energy planning.

The Industrial subprograms targeted and completed projects in various facilities including oil production, printing plants, plastic injection molding, component fabrication, lumber and paper mills, cement and quarries, metals processing, petroleum refineries, chemical industries, assembly plants, and water and wastewater treatment plants.

PG&E marketed and delivered these offerings through several channels, including direct communication with facility personnel, presence at industry events, support for education and research activities, and close partnerships with engineering and installation firms. PG&E's portfolio of offerings also includes specialized third-party subprograms focused on specific technologies, segments, or approaches with specialized requirements. These third-party subprograms bring detailed knowledge of industrial processes and are described in more detail in the Third-Party Programs section.

2018 Strategies and Successes

Industrial customers are sophisticated in their understanding of energy usage within their facilities. While these customers understand and appreciate EE, decisions to upgrade to energy-efficient equipment must be balanced with minimizing operational and production risks. PG&E works closely with customers to understand their business needs so that subprograms are thoughtfully designed, and offerings align with customers' requirements.

Serving Our Industrial Customers:

PG&E's industrial customers benefit from segment specific program offerings delivered through its third-party program channel.

PG&E leverages its Industrial third-party subprograms to provide technical expertise relevant to the customer segment, test new and innovative measures, program strategies and design, and provide turn-key/concierge services which help to meet customer needs. In 2018, third-party programs specifically targeting oil fields, refineries, heavy industry, light industry, water/wastewater plants and food processors completed 124 efficiency projects.





PG&E depends on a team of EE experts including account representatives, project engineers, contractors, and third-party implementers with deep technical knowledge and understanding of industrial processes to offer industrial customers the right EE solution at the right time—from EE audits and scoping EE projects via its Energy Advisor Program, to financial offerings to install EE projects through its calculated and deemed customer incentive subprograms or its OBF subprogram.

In 2018, PG&E supported and processed 77 projects through the Industrial program. Gas savings are primarily attributed to oil production, while electric savings are primarily credited to improved process modification and controls, and pump and fan retrofits. The various cost savings and the non-energy benefits associated with reduced maintenance of higher efficiency equipment was a successful method of championing EE projects within all industrial sectors.

In addition to working with customers to support their analysis and project development needs, PG&E also invested time and resources in guiding and training project developers on best practices in selecting and qualifying appropriate industrial projects for custom incentives. PG&E's project development protocol was an important tool to help establish the necessary documentation to understand the customer's standard practices, measure eligibility, and general decision-making framework. The training and coaching provided by PG&E's in-house engineers was pivotal to helping these customers adapt to new policies.

Opportunities Moving Forward

PG&E is focused on opportunities to support a swiftly evolving marketplace and will be engaging with national and statewide stakeholders to develop new prescriptive measures and technical specifications that benefit industrial process and equipment efficiency. PG&E will also be preparing for the portfolio transitions envisioned in PG&E's Business Plan, and conducting portfolio balancing reviews to form a cost-effective and well-performing set of programs following the sector solicitations process in 2019.

Industrial Subprograms

Industrial Calculated Incentives Subprogram

The Industrial Calculated Incentives subprogram provides customized incentives for non-residential EE retrofit and new construction projects involving the installation of high-efficiency equipment or systems. Incentives are paid on the energy savings and permanent peak demand reduction above and beyond baseline energy performance, which include state and federal-mandated codes, ISP, or other baseline energy performance standards. Focus areas included process and non-process loads at various industrial facilities that reduced energy usage associated with process modification and controls, boiler and steam systems, high bay and outdoor lighting measures, and pumps and fans.

2018 Strategies and Successes

In 2018, PG&E focused on direct engagement of customers by pursuing two primary strategies. First, PG&E used its team of experienced, local, and dedicated account representatives and field engineers via local workshops, trade shows and industry events. Second, PG&E continued to develop and enhance its partnerships with industry associations and equipment vendors. Finally, PG&E continued to make improvements in project quality and consistency in policy interpretation, including application of consistent baselines, measure costs, and ISP determinations across projects.



Deemed Incentives Subprogram

The Industrial Deemed Incentives subprogram provides rebates for the installation of new EE equipment and measures. Deemed retrofit measures have fixed incentive amounts per unit/measure and are intended for projects that have well-defined energy and demand savings. In many cases, projects are identified through utility EE audits, customer communications with PG&E account representatives, or partnerships with equipment vendors and trade allies.

2018 Strategies and Successes

As the price of LED lighting continues to go down, 2018 saw continued growth in adoption of high bay lighting in industrial and warehouse spaces, resulting in more projects.

Industrial Continuous Energy Improvement Subprogram

The Industrial Continuous Energy Improvement (CEI) subprogram is a consultative service which targets long-term and strategic energy planning. CEI is designed to reintroduce the importance of energy management through a comprehensive energy management approach involving identification and tracking of energy productivity metrics, identifying stakeholders for the company's energy and associated financial impacts, planning for capital projects, and sharing of best practices within the organization and amongst cohorts of peers.

2018 Strategies and Successes

In 2017, PG&E developed a case study sheet to educate customers and account representatives on the benefits and results of a cohort engagement analysis. This became an important resource as the new SEM subprogram launched in 2018. In 2018, PG&E transitioned a majority of its CEI activities to the Industrial SEM subprogram at CPUC's direction.²⁰ PG&E sees a benefit in using the CEI subprogram to assess the feasibility of alternative SEM formats that would be conducive for small to medium industrial customers. The SEM program is a third-party program, discussed more below. Because of this, CEI was sunset in 2018.

Industrial Energy Advisor Subprogram

The Industrial Energy Advisor subprogram provides customer education and encourages participation in EE, DR, self-generation subprograms and promotes awareness of GHG and water conservation activities. The subprogram works to assist customers in the implementation of the appropriate solutions for their business while placing an emphasis on deep energy savings opportunities and continuous improvement over time. Aligning integrated improvement opportunities with customers' needs, the Energy Advisor Program helps customers appreciate EE benefits therefore increasing subprogram participation and adoption rates.

2018 Strategies and Successes

PG&E continued to offer on-site and remote energy audits, including integrated audits that combine EE recommendations with DR and DG information. In addition, PG&E focused attention on close coordination with large end-use customers to understand project scope and timeframe constraints to better influence customer selection of state-of-the-art EE and demand management solutions.

²⁰ D.16-08-019, pp. 41-42.

Industrial Third-party Programs

The third-party subprogram delivery channel is important for the Industrial sectors. The Industrial third-party programs offer a thoughtful, niche approach that continues to deliver savings, serve customer needs, and stay innovative by adapting to changing market needs.

California Wastewater Process Optimization Subprogram (CalPOP)

Implementer: QuEST

CalPOP targets wastewater treatment plants and provides facility audits, engineering assistance, project management support and financial incentives based on potential energy savings. The subprogram helps wastewater treatment facilities optimize their processes to reduce energy usage. CalPOP identifies energy savings opportunities related to surface aeration processes (delivered DO sensors, controls, and training) as well as the optimization of all treatment type equipment and process eligible for IOU incentives.

CalPOP's first subprogram iteration in 2000 focused on wastewater treatment facilities as major energy consumers. Initially it focused on surface aeration optimization—delivering Dissolved Oxygen sensors, controls, and training. This broadened to include all treatment types and equipment optimization and retrofit.

2018 Strategies and Successes

In 2018, the subprogram focused on incorporating Standard Practices in its subprogram design and outreach approach. CalPOP continued to improve customer technical support, engagement with the municipal approval process for the various water agencies, and implementation project management. Due to low participation, the program closed in December 2018.

Energy Efficiency Services for Oil and Gas Production

Implementer: CLEAResult

Energy Efficiency Services for Oil and Gas Production is a turnkey custom measure incentive subprogram designed to deliver reliable and persistent electric savings by educating and assisting oil and gas producers and pipeline operators to take advantage of the latest technologies and processes to improve their operations to save energy and improve efficiency.

2018 Strategies and Successes

This subprogram has been ongoing since 2006 and targets oil and gas producers of all types, providing focused assessments, calculation and documentation support, and financial incentives based on actual energy use reductions. It has convinced the customer base to adopt changes through education and persistent follow through with customers to implement projects.

PG&E leveraged a promotional subprogram brochure that informed customers of qualifying projects and EE measures, participation process, and incentive amounts to reach out, introduce, stimulate and recruit eligible oil and gas producers to participate. PG&E also used PG&E Account Managers, Trade Allies (equipment vendors), and industry information to create customer contact lists, and participated in industry associations and other forums to reach out to qualifying customers. PG&E will continue to push for adoption of new technologies (e.g., MotorWise™), adjust marketing efforts to focus the communicated benefits of the subprogram on avoided energy costs rather than on available technology, and identify ways to expedite project commitment approvals so customers can act quickly once a qualified project has been identified.



Heavy Industry Energy Efficiency Subprogram

Implementer: Lockheed Martin Corporation

The Heavy Industry Energy Efficiency Program (HIEEP) identifies and facilitates the implementation of major process-oriented and other EE upgrades for large industrial manufacturing customers and recently added Food Processing facilities in the Central Valley.

2018 Strategies and Successes

The Lockheed Martin Energy HIEEP subprogram and PG&E have worked collaboratively for years to enhance and streamline process and subprogram flow. Through close collaboration with PG&E, HIEEP has enhanced customer service throughout the PG&E service territory by strategically placing field offices closer to the customer. The opening of the Bakersfield, CA office resulted in greatly improved timeliness and responsiveness to PG&E's Central Valley customers while at the same time increased collaboration on a variety of EE projects with both PG&E and the end use customers. In 2018, HIEEP gained momentum with Central Valley Food Processors and continued to explore new opportunities for all segments they engage with.

Industrial Refrigeration Performance Plus Subprogram (IRPP)

Implementer: VaCom Technologies

IRPP targets refrigerated warehouses, food processors, and related cooling operations that operate year-round or seasonally in the food and beverage sector, including processing, storage, and distribution operations with industrial refrigeration systems. Under IRPP, existing facilities are retrofitted, emphasizing refrigeration system improvements as well as envelope, pumping, air handling, and related process equipment. Whole-facility simulation is used to quantify savings and economics. Two years of web-based automated performance monitoring and associated operator education is included to provide transparency and permanence of savings. IRPP provides more complex, comprehensive integrated solutions, higher savings levels and institutes a continuous improvement paradigm delivered through real-time performance monitoring and advisory services.

2018 Strategies and Successes

In 2018, the subprogram was able to successfully finalize one project for payment, but ultimately began a transition plan to ramp down activities due to low participation. IRPP will continue ramping down through 2019 and is expected to sunset in 2020.

Industrial Retrocommissioning Subprogram

Implementer: Nexant, Inc.

The Industrial Retrocommissioning Program (IRCx) Program is the first of its kind in PG&E's service territory. It serves the industrial manufacturing sector and commercial processing facilities with built-in requirements designed to promote savings persistence. For some implemented measures, the maintenance plan can consist of a computerized maintenance management system, multi-year contract with a preventive maintenance contractor (typically three years) or purchasing equipment to review the operation of the system and training personnel on how to use this equipment.

IRCx targets the heavy industry, manufacturing, bio-tech, high tech, and food processing sectors and generates energy savings by helping PG&E customers optimize their manufacturing processes and process cooling systems by systematically studying low-profile energy losses that commonly occur in these facilities.



2018 Strategies and Successes

Because of the unique nature of each facility, the IRCx Program facilitates the delivery of audits, and if needed, implementation, by subject matter experts in these types of specific disciplines. The subprogram's consultants and service providers allow the subprogram to provide industries with the most comprehensive energy solutions available from their utility.

Instead of focusing on a small part of the equipment, the IRCx subprogram optimizes whole system operations, achieving deep energy savings for the customer. One example includes enhancing the control systems to allow the customer a more transparent operation of their system, so that they can monitor the system and maintain the energy savings level in the future. In 2018, the IRCx subprogram developed projects with biotech and hi-tech customers, focusing on their process cooling systems. These projects are a recent addition for the subprogram, with energy saving potential for these previously underserved customers.

Industrial Compressed Air System Efficiency Subprogram (ICASE)

Implementer: AALD

The ICASE subprogram was selected as an innovative subprogram for the IDEEA 365 solicitation process. The subprogram targets industrial customers with large (greater than 100 horsepower) compressed air and vacuum systems and promotes and installs a state-of-the-art control and data monitoring system called iZ. Compressed air and vacuum systems are dynamic systems that are constantly changing and deteriorate quickly when not closely monitored. iZ automation system delivers support and assists customers with keeping efficiencies that have been initially gained by implementing an EE project.

2018 Strategies and Successes

The subprogram developed outreach processes to provide extensive education to local account representatives and engineering staff about advantages, features, and capabilities of the new iZ control system. Staff also conducted parallel comprehensive market research to justify acceptance of the proposed control systems over others existing on the market. ICASE concentrated on targeting compressed systems based on centrifugal compressors as higher EE potential.

Refinery Energy Efficiency Subprogram (REEP)

Implementer: Nexant

REEP educated key stakeholders on energy-efficient practices in refineries and assisted PG&E's largest refinery customers in developing and implementing EE projects in PG&E's territory. Nexant brought specialized expertise in refinery engineering and construction to analyze EE options available to PG&E's sophisticated industrial customers.

2018 Strategies and Successes

Seeing the gradual decline in performance year over year alongside PG&E's strong relationship with these large customers, PG&E filed to close the REEP subprogram in 2017.²¹ This decision enabled PG&E to refine targeting strategies and guide market participants through a design that ensured cost-effective, reliable energy savings in the future. In 2018, a transition plan was instituted to facilitate the completion of existing projects in Nexant's pipeline and aid the transition of project development to PG&E's field engineering staff. The program sunset in December 2018.

²¹ Fourth Supplemental: PG&E's 2017 Energy Efficiency Annual Budget Advice Letter, AL 3753-G-D/4901-E-D.

Small Petrochemical Energy Efficiency Subprogram (SPEEP)

Implementer: APTIM

CB&I's SPEEP subprogram was selected in 2016 through an IDEEA 365 solicitation and was designed to deliver turnkey EE services to underserved and hard-to-reach customers in PG&E's refinery and petrochemical markets. The subprogram targeted smaller refineries in the southern portion of the PG&E service territory, and smaller and medium sized petrochemical customers throughout PG&E territory. The subprogram offered custom and deemed retrofit, as well as industrial RCx project services, and utilized SEM planning approaches and tools to develop and implement strategies and projects.

2018 Strategies and Successes

Since launching in 2016, SPEEP conducted market outreach to targeted customers, completed one SEM plan and initiated development of various gas and electric projects with three companies. Because SPEEP targeted smaller and mid-sized customers, the subprogram worked closely with the Mid-Market account team to target customers and develop a marketing and outreach campaign. SPEEP also raised customer awareness of certain sunsetting measures to create a sense of urgency and initiate subprogram services and assessments.

High priority project opportunities included steam trap replacement, lighting replacement (interior/exterior), pump VSD control, cooling tower VSD control, high-efficiency motor, compressor VSD, and insulation upgrade, among others. Due to low participation, the program closed in December 2018.

Water Infrastructure System Efficiency Subprogram

Implementer: Lincus

The Water Infrastructure System Efficiency (WISE) subprogram focuses on the energy optimization of water and wastewater systems in California. The subprogram targets comprehensive system optimization by targeting component improvements first and then optimizing the whole system through measures such as pump sequencing and system optimization through hydraulic modeling.

2018 Strategies and Successes

Launched in 2014, the WISE Program has continued to develop water system benchmarks, project prioritization lists, and energy audits to demonstrate cost-effective EE opportunities with customers. In addition, the WISE subprogram has evaluated energy intensities of various water system components and the embedded energy in customer water and wastewater systems through Water Energy Nexus reports. WISE targeted system optimization projects aimed at long-term EE improvements.

Most water and wastewater customers show tremendous opportunities to reduce the energy consumption of their systems. Although customers operate effective, reliable, and safe water systems, little emphasis is put on EE of their systems. Through the technical support and incentives provided through the WISE subprogram, enrolled customers are identifying cost-effective opportunities to meet their customer demands while reducing energy use. Depending on the embedded energy of their system, water conservation measures may yield significant energy savings as well. Since WISE has been extended, the subprogram has continued to work with new and existing customers to develop long-term system transformation projects that will include pump efficiency improvement projects, pump sequencing optimization, water system optimization using hydraulic models, among other comprehensive EE measures.

Food Processing Subprogram

Implementer: CLEAResult

The Food Processing Program is a comprehensive subprogram designed to assist food processing customers to identify plant-wide electric and gas energy savings opportunities by providing technical assistance to quantify energy savings and help with the application process to provide cash incentives that encourage implementation of EE projects. CLEAResult's comprehensive subprogram approach encourages deep savings and long-term engagement from many customers, as food processors have diverse operations with multiple opportunities for EE measures.

2018 Strategies and Successes

In 2018, the subprogram focused on marketing through direct outreach to customers, working closely with PG&E account representatives, and educating equipment vendors about eligible measures as applied to their equipment and services. The subprogram also utilized industry associations and other forums such as the California League of Food Processors (CLFP) to reach out to qualifying customers. A primary subprogram challenge has been the barrier to entry for customers pursuing calculated projects. The length of the pre-approval cycle can be long, depending on the complexity of the project, and this presents a challenge for food processing customers who commonly face strict internal timelines for production and for authorizing budgets. Strategies to address this issue in 2018 included PG&E offering project developers increased access to early project feedback from PG&E reviewers, as part of general improvements to the calculated review process for all subprograms.

In 2018, PG&E transitioned a portion of its Food Processing engagement from the Agricultural portfolio to the Industrial SEM program. For more details, see the section on Industrial SEM below.

Agriculture and Food Processing Wastewater Energy Subprogram (WEP)

Implementer: BASE Energy, Inc.

The Agriculture and Food Processing Wastewater Energy Subprogram (WEP) helps customers in agriculture, food processing, and beverage processing facilities pursue EE and water conservation projects that yield energy savings in wastewater treatment. Through the Wastewater Energy Program, BASE Energy provides economic and engineering feasibility studies for potential projects, assistance in project design and implementation to ensure long-term energy savings, and calculated customer incentives to partially offset capital costs.

2018 Strategies and Successes

2018 was a difficult year for WEP. Key challenges included a low volume of projects and delays in project timelines, which decreased predictability of results throughout the year.

BASE Energy partnered with PG&E's Business Energy Solutions representatives to increase customer engagement in both new and existing projects and hired new marketing personnel to increase outreach. Other outreach and marketing efforts have included leveraging the CLFP and associated trade conventions.



Industrial Strategic Energy Management

Implementers: Leidos, Inc. (SEM Manufacturing) & CLEAResult (SEM Food Processing)

SEM is a holistic, long-term, whole facility approach that uses advanced implementation, measurement and verification services and tools to determine energy savings from all subprogram activities at the facility, including capital projects, maintenance and operation improvements, as well as RCx. The methodology and subprogram requirements were defined through a collaborative effort between the IOUs, CPUC, and external subject matter experts. Both programs were launched in 2018, successfully recruited a total of 22 participants, and completed all milestones required by the SEM Design Guide from program inception through the end of the year. Such milestones included kick-off meetings, scoping reports, workshops and, some of the initial site activities.

2018 Strategies and Successes

In 2018, PG&E completed a rigorous competitive bidding process for selecting third-party vendors with innovative SEM outreach approaches. The final selection resulted in the establishment of two different market strategies, utilizing the SEM guidelines as defined by the IOUs and CPUC. The two target markets for this subprogram are Food Processing and Manufacturing. Program implementers are developing and submitting baseline/hypothesis models for review, completing treasure hunts, and developing opportunity registers to be included on customers' action plans. PG&E is collaborating with the other IOUs and CPUC to finalize the design elements for SEM's continuation.

Agricultural Program

In 2018, the Agricultural EE program provided a portfolio of offerings to support an industry heavily impacted by five years of statewide drought conditions. The Agricultural program, coupled with DR and DG programs, helped agricultural producers and processors manage energy costs and make informed investments in new equipment. Through three agricultural-focused subprograms, PG&E offered a full suite of tools to position California agricultural customers to eliminate unnecessary energy use. Key offerings included rebates and incentives for efficient equipment and systems, technical support such as facility audits and energy savings analysis, zero interest project financing, and pump efficiency education.



Programs in 2018 targeted the agricultural growers (field crops, fruits and nut trees, vegetables, and vineyards), post-harvest processors, dairies, irrigation districts/agencies, fruit and vegetable processors (canners, dryers and freezers), agricultural service providers, wineries, and other beverage manufacturers.

PG&E marketed and delivered these offerings through a variety of channels, including direct communication with customers, advertising in industry publications, presence at industry events, support for education and research activities, and close partnerships with engineering and installation firms. PG&E complements its statewide EE offerings with concierge EE solutions through its third-party programs focused on specific technologies, segments, or approaches with specialized requirements. These programs are described in more detail in the Third-Party Programs section.

2018 Strategies and Successes

Local presence in agricultural communities. PG&E focused on building trust with customers in their own communities by providing information about efficient irrigation equipment and operations via trusted trade professionals, scheduling workshops with partners such as local farm bureaus and the League of Food Processors and collaborating with agricultural universities such as CSU, Fresno and California Polytechnic State University, San Luis Obispo (Cal Poly).

Water Energy Nexus. The agricultural industry is a central stakeholder in California's water-energy nexus, with a footprint of nearly 80 percent of California's developed water usage, 4 percent²² of annual energy use statewide. Using existing and new subprograms, PG&E continues to prioritize approaches to improve water and energy management for growers and manufacturers.

²² California's Water Energy Relationship; Prepared in Support of the 2005 Integrated Energy Policy Report Proceeding (04-IEPR-01E). CPUC. 2005.



Evolving subprogram offerings. PG&E deployed a new methodology for agricultural pump overhaul calculations, which was developed and analyzed in 2017 through a partnership with Cal Poly. PG&E responded to new opportunities in the irrigation market by developing an enhanced irrigation variable frequency drives (VFD) specification in conjunction with Cal Poly with input from manufacturers and vendors. The new VFD measure launched in 2018.

In 2018, more than \$4.9 million of PG&E incentives supported investments for 834 applications, including 47 by third-party subprograms. These savings come from a wide range of statewide coordinated and local and regional subprogram offerings and through PG&E's segment-specific third-party programs.

Opportunities Moving Forward

The agricultural industry's energy usage has grown in recent years as surface water supplies decreased, local water tables dropped, and businesses invested in new equipment and capacity to improve production capabilities. Pump and irrigation energy usage requires comprehensive management, technology, and operations approaches to achieve reductions. To further agricultural customers' EE opportunities, PG&E is evaluating new technology-enabled approaches to water and energy management, including sensing technologies, analysis tools, and process automation via partnerships with start-up companies, agricultural universities, and leading growers. Ultimately, these technologies may be a core component of PG&E's Agricultural subprogram strategy. In the near term, PG&E will continue to support investments in VFDs and other opportunities to improve the efficiency of irrigation systems. PG&E is also exploring ways to serve customers with process lighting for dairy and indoor agricultural operations.

In 2018, an RFA was issued for new agricultural programs as part of PG&E's Business Plan strategies and to move towards meeting the CPUC's 60 percent third party program portfolio minimum for 2023. Bidders are expected to propose innovative EE solutions targeting agricultural customers that meet their unique needs and interests. This process will continue into 2019.

Agricultural Subprograms

Agricultural Calculated Incentives Subprogram

The Agricultural Calculated Incentives subprogram offers incentives for a wide range of energy-efficient technologies including steam systems, refrigeration equipment, and lighting technologies. PG&E account representatives and engineering experts work closely with customers throughout the design and installation process to evaluate, and help customers implement the most energy-efficient technologies. Customized projects were carefully tracked from audits through project completion, with PG&E EE experts involved at each step.

2018 Strategies and Successes

The Statewide Agricultural Calculated Incentives subprogram provided incentives for 27 applications, with incentives ranging from less than \$10,000 to nearly \$194,000. Following the geographical concentration of California's agricultural industry, projects were concentrated in the Central Valley and Central Coast.



Agricultural Deemed Incentives Subprogram

The Agricultural Deemed Incentives subprogram provides fixed rebates for high volume measures, such as HVAC, lighting, and irrigation equipment. Projects are typically identified through utility EE audits, customer communications with local PG&E account representatives, or partnerships with equipment vendors and trade allies.

Program information was communicated to a customer base of over 35,000 growers through training events, mass media advertising, and the expertise of PG&E's dedicated agricultural local account representatives and call center representatives.

2018 Strategies and Successes

PG&E continued a rebate offering for VFD equipment for agricultural irrigation pumps, which helped farmers control pumps in response to operational needs. The Deemed Program offers a better use of subprogram administration costs for this high-volume measure, while enabling a simpler customer experience.

Agricultural Energy Advisor Subprogram

In addition to a range of on-site and online energy audit offerings, the Agricultural Energy Advisor subprogram provides pump efficiency services, known as the Advanced Pumping Efficiency Program. This subprogram offers pump tests and incentives for pump efficiency improvements to agricultural, municipal, and irrigation district customers.

2018 Strategies and Successes

To assist businesses and governments, PG&E has allocated substantial funding for pump efficiency tests. These services were communicated through training events, mass media advertising, and PG&E's ongoing partnership with CSU, Fresno's Center for Irrigation Technology.

Based on feedback from the Commission staff's ex ante review team, and ex-post evaluation results, PG&E engaged California Polytechnic State University Irrigation Technology Resource Center to develop and test a new agricultural pump overhaul calculation methodology. This new methodology was deployed and accounts for future planned operations and environmental conditions in addition to historic usage and pump efficiency. By utilizing this new methodology, PG&E is laying the groundwork to develop calculation tools which will access deeper energy savings.



Agricultural Third-party Program

The third-party agricultural subprogram offers a tailored solution to the specific needs of PG&E's agricultural customers. Through customized solutions and thoughtful program delivery, PG&E's third-party implementers serve the unique energy needs of the diverse Agricultural sector.

Dairy and Winery Industry Efficiency Solutions Subprogram (DWIES)

Implementer: CLEAResult

The subprogram provides a comprehensive approach to helping dairy, winery, and brewery customers identify and evaluate the energy saving opportunities and facilitating customer action. The objective of the Coordination Activities is to identify all parties that have programs related to the DWIES subprogram and to develop a strategy that minimizes customer confusion, avoids duplication of services or costs, and identifies synergistic opportunities. Two previously implemented subprograms by CLEAResult for dairies and wineries were combined into the DWIES subprogram in 2017 to improve the economics of subprogram implementation.

2018 Strategies and Successes

DWIES leveraged vendor relationships to coordinate the timing of installation for qualifying high-efficiency ventilation equipment and smart controls to help dairy farmers and their cows beat the summer heat and reduce energy usage and demand. Retrofit projects replaced many small-diameter, inefficient fans with fewer large-diameter, high-efficiency fans, while new load projects successfully moved dairy farmers directly to systems that included highest efficiency, large-diameter fans with variable speed controls.

OBF is promoted and has been well received by this market. Dairy farmers have leveraged OBF as a resource to ensure that projects move forward. The greatest success continued to be the close working relationship between DWIES and PG&E account managers, where customer needs are shared and strategies are developed jointly to maintain a high level of customer service.

Emerging Technologies Program

The Emerging Technologies Program (ETP) is a statewide initiative designed to reduce time-to-market for introduction of EE technology solutions aligned with the California EE Strategic Plan (Strategic Plan). ETP increases supply of and market demand for EE technology solutions, delivered through three core subprograms: Technology Development Support (TDS), Technology Assessment (TA), and Technology Introduction Support (TIS).

Under the statewide ETP, the TDS subprogram's primary goal is to communicate and collaborate with entrepreneurs and technology providers to increase the supply of EE technology solutions. In parallel, the TA subprogram identifies and assesses the performance of emerging EE technology solutions in all sectors that may be offered to customers. Finally, the TIS subprogram seeks to introduce solutions to the market by exposing end users to applications of emerging EE technology solutions in real-world settings, and by harnessing third-party projects to deploy such technology solutions on a limited scale in the market.

ETP uses numerous strategies—such as Lab Testing, Field Testing, Demonstration Showcases, and Technology Resource Incubator Outreach (TRIO)—to achieve the objectives of its three subprograms.

ETP enables PG&E to reduce certain market risks by testing and benchmarking new and innovative products, services, and market solution approaches. This helps EE programs understand potential barriers—technical or non-technical—to high adoption rates for new EE technology solutions.

Opportunities Moving Forward

In 2019, PG&E will maintain its focus on expanding the pool of new and innovative ideas and solutions that can be offered to customers. PG&E's focus will be more targeted towards time of day and specialized customer segments. Based on EE market and technology trends, together with the updated avoided costs, PG&E will place emphasis on integrated solutions (HVAC with lighting, DR, DG, etc.), data analytics, and software-based solutions to help deliver greater value to the customer and drive higher adoption rates while delivering the energy savings when most needed. The advent of software controls combined with high-quality, reliable end user energy consumption and demand data, enables PG&E to target granular end use solutions and further engage customers in realizing both long-term Strategic Plan and EE Portfolio goals.

Testing Innovative Solutions through the Emerging Technologies Program

PG&E's ET team actively seeks out new, innovative technology solutions and market approaches, soliciting ideas from both internal and external EE stakeholders to assess potential new technologies for PG&E's EE portfolio in a strategic way. ETP enables PG&E to test and benchmark new and innovative products, services, and market solutions to help bring our customers new and improved opportunities to save energy.



Emerging Technologies Subprograms

Technology Development Support (TDS) Subprogram

The TDS subprogram assists entrepreneurs, investors, and technology providers develop new or improved EE technologies and solutions for the marketplace. IOUs are strongly positioned to undertake targeted, cost-effective activities that provide value in support of private industry product development efforts, decreasing innovator uncertainties. Broadly, the ETP seeks targeted opportunities to support EE product development. Product development constitutes the process of taking an early-stage technology or concept (including at the Research and Development stage) and transforming it into a product that meets a market need.

ETP also supports product development through TRIO roundtables, symposia, and other means. TRIO provides support and networking for EE and DR entrepreneurs, investors, and universities with the goal of providing participants with the requisite perspective and tools to work with IOUs. TRIO symposia educate technology developers about the requirements that IOUs must apply when considering new technologies and solutions for inclusion in IOU EE programs. TRIO roundtables are aimed at a smaller audience and have focused on market demand and technological innovation, prior to a full ET assessment (see below).

Supplementary to TRIO support, market and behavioral studies investigate the market potential for early-stage technologies and solutions. Ultimately, the goal of the TDS subprogram is to communicate and collaborate with entrepreneurs and technology providers to increase the supply of EE technology solutions, including breakthrough technologies and innovations, to the market.

Technology Assessment (TA) Subprogram

Through the TA element of ETP, energy-efficient technology solutions that are either new to the market or underutilized for a given application are evaluated for performance claims and overall effectiveness—namely cost and end customer attractiveness—in reducing energy consumption and peak demand. Two key objectives of these assessments include: (1) the adoption of new measures into PG&E's EE portfolio, and (2) the deeming of specific technology solutions as *not* market ready.

Historically, TAs have been a core strength of ETP and have provided critical support to EE programs. ETP assessments may utilize data and information from different sources to support assessment findings, including: in-situ testing (customer or other field sites), laboratory testing, or workpaper studies. In addition to other findings and/or information, assessments typically generate some of the data necessary for EE rebate subprograms to construct a workpaper estimating energy and demand savings over the lifetime of the measure. Furthermore, technology solutions that are designated as “not market ready” nonetheless assist technology providers enhance their offerings for the EE marketplace.

Technology Introduction Support (TIS) Subprogram

The TIS subprogram supports the introduction of new technology solutions to the market through several activities. Scaled Field Placement projects are the deployment of a technology solution at multiple, participating customer sites as a key step to gain market traction and feedback. Typically, such measures have already undergone a TA or similar evaluation to minimize the risk of failure. Demonstration and Showcase projects are designed to provide key stakeholders the opportunity to thoroughly vet and understand the value of proven technology solutions that advance ZNE, IDSM, and other Strategic Plan goals. The overall aim of Demonstration and Showcase projects is to introduce technology solutions to stakeholders from

a systems and potentially integrated level rather than an individual (widget-based) perspective using data gathering and customer feedback in a real-world environment. In addition, the demonstration showcase exposes the technology solution to the public, investors, entrepreneurs and technology professionals, and increases market knowledge for the technology provider. Market and behavioral studies are designed to perform targeted research on customer behavior, decision making, and market behavior to gain a qualitative and quantitative understanding of customer perceptions and acceptance of new technology solutions and business models, as well as market readiness and potential for new EE measures.

2018 Strategies and Successes

In 2018, PG&E initiated eight ET projects (three TDS, two TA, three TIS) projects. PG&E also assisted in planning and preparations for two Emerging Technologies Coordinating Council (ETCC) Summits in 2018; one at UC Davis in April and one at the SoCalGas Energy Center in October. The 2018 ETCC Summits intended to provide thought leadership and information sessions on high potential technology areas within the EE sector, such as industrial process management and Connected Home, with a focus on the following:

- 1) Interactive conferences to learn, debate, and develop the intersection of utility programs, technology, market drivers, customer engagement, policy and implementation to impact the advancement and adoption of ET.
- 2) A place to connect, engage and uncover new business opportunities with industry-leading entrepreneurs, technology developers, investors, implementers, researchers, utilities, regulators, and property owners/manager.

Details around PG&E's completed ETP projects are accessible via the ETCC website: <http://www.etcc-ca.com>. Examples of three of these projects are provided below.

Connected Home Market Study

This study was commissioned to provide a summary on the industry state of the Connected Home space, with the goal of developing a deeper understanding of the market players and determining the point of influence in the market and/or technology space that utilities need to address to obtain the value of potential "stacked" energy effects that may be available from orchestration of multiple devices in residential households. Its research and analysis led to a recommendation of interconnecting all facets of the connected home energy ecosystem and the customer journey, through personalized customer offerings.

Liquid Cooling Market Study

This study aimed at understanding recent developments in the emerging technology of liquid cooling in data centers, market perception, and potential energy savings. It reviewed currently available liquid cooling technologies and solutions for data centers and assessed their advantages and limitations vis-à-vis current air cooling technologies. The study found that liquid air cooling saves about 90 percent of cooling energy compared to conventional air-cooled systems, even though the technology is still emerging. It recommended that field demonstrations of the technologies could be a next step, and ultimately recommended that liquid cooling technology be considered in EE incentive programs, most likely in custom programs.



Tier 2 Advanced Power Strips (APS) Self-Install

Building on previous studies pertaining to Tier 2 APS energy savings potential, this project assessed the effectiveness of a downstream, self-install approach by selling a heavily discounted APS directly to interested customers. Subsequently, each purchasing customer was surveyed to evaluate installation rates, customer satisfaction, and persistence rate for self-installed Tier 2 APS. The final recommendation the project provided was a self-install incentive program for Tier 2 APS, specifically Bluetooth compatible models to improve interoperability with third-party electronics, targeted towards households with gadget friendly profiles.

Advanced Metering Infrastructure (AMI) and Water Savings Study

PG&E continued work on the pilot project launched in 2016 to further understand opportunities for electric utilities and water agencies to collaborate. This pilot focuses on the use of AMI to deliver water savings data. This study measures the value of communicating AMI dependent data (i.e., information collected and conveyed at an hourly temporal resolution at a minimum) to consumers in terms of household water, electricity, and gas consumption. The project will provide information on how behavior-based messaging affects both energy and water savings in the residential sector. This pilot spans multiple years and involves PG&E's water utility partner, East Bay Municipal Utility District, installing over 10,000 new smart water meters and associated infrastructure. At the end of 2018, the new AMI installations were over 90 percent completed with the 12 months observation period starting mid-2019.

Lighting Innovation Subprogram

Lighting Innovation is a non-resource subprogram within the Statewide Lighting Program that evaluates advanced lighting products or subprogram approaches new to the market, which have potential to eventually enter the Primary Lighting Residential upstream subprogram or the Commercial, Industrial, and Agricultural programs. Trials and studies are administered to determine recommendations, showcases, and field placement projects are conducted when applicable. Starting in 2019, PG&E plans to support any continued Lighting Innovation activities through the ETP.

2018 Strategies and Successes

PG&E continued progress on its final Lighting Innovation Trial, the Advanced Lighting Control System (ALCS) Calculator Trial, which launched in Q2 2016. This trial is a part of a coordinated approach amongst the IOUs to support Goal Number 2 of California's Long-Term EE Strategic Plan's Lighting Action Plan to "define and advance best practices for design, installation, operation and maintenance of integrated systems to achieve sustainable lighting solutions for all spaces." Each of the California electric IOUs is targeting different aspects of ALCS. PG&E's contribution to the ALCS Calculator is intended to enable simplified savings estimation for various advanced lighting control strategies. The ALCS Calculator Trial is expected to be complete in Q1 2019.

Codes and Standards

The Statewide C&S program saves energy on behalf of ratepayers by collaborating with regulatory bodies, such as the CEC and the U.S. Department of Energy (DOE), to strengthen EE regulations. The Program conducts efforts to increase compliance with existing C&S regulations to ensure that the State realizes the savings from new C&S and supports local governments that include Reach Codes (RC) as a climate strategy. PG&E also conducts planning and coordination with other IOUs) statewide to optimize collaboration and CR activities to prepare for future codes.

California 2018 C&S Savings²³

	Gross Savings			Net Standard Savings			Net Program Savings		
	GWh	MW	MMTherm	GWh	MW	MMTherm	GWh	MW	MMTherm
Statewide	9,501	1,877	36.3	4,997	1,084	45.8	2,026	466	39.2
All IOUs	6,798	1,343	76.8	3,575	776	64.6	1,450	333	45.3
PG&E	3,001	593	13.2	1,578	342	16.7	640	147	14.3
SCE	3,095	611	0.0	1,628	353	0.0	660	152	0.0
SoCalGas	0	0	62.0	0	0	46.0	0	0	29.4
SDG&E	702	139	1.5	369	80	1.9	150	34	1.6

Program advocacy and CI activities extend to virtually all buildings and appliances sold in California in support of the California's ambitious climate and energy goals. Through adoption of 2019 building EE codes, California has achieved the EE Strategic Plan goal that, "New construction will reach ZNE performance (including clean, onsite DG) for all new single and low-rise multi-family homes by 2020,"²⁴ and PG&E continues to move California towards non-RNC ZNE buildings by 2030 and other major objectives, including: carbon reduction targets in 2020 equivalent to 1990 emissions levels²⁵ and 40 percent below 1990 by 2030;²⁶ a cumulative doubling of statewide EE savings in electricity and natural gas final end-uses by January 1, 2030²⁷ to reduce existing building energy usage by 50 percent; near-zero-emission building technologies to significantly reduce the emissions of GHGs from buildings.²⁸

²³ Gross Savings equal potential savings corrected for compliance rate. Net Standards Savings equal Gross Savings after correcting for normally occurring market adoption. Net Program Savings are calculated by applying an attribution factor to Net Standards savings. Savings are based on a combination of data from CPUC ex-post evaluation studies and C&S program forecasts and do not include market effects. Negative gas impacts due to interactive effects were applied to PG&E and SDG&E, but not SoCalGas. While therm savings for "All IOUs" are based on mixed treatment of negative gas impacts, statewide therm savings include negative gas impact for the whole state, so statewide therm savings are lower than those of "All IOUs." The magnitude of the difference stems from large savings from General Service Lamp (GSL) standards.

²⁴ California Long Term Energy Efficiency Strategic Plan.

²⁵ AB 32 (California Global Warming Solutions Act of 2006).

²⁶ AB 398 and SB 32 (Health and Safety Code Sections 38501(i) and 38566).

²⁷ SB 350 (Clean Energy and Pollution Reduction Act of 2015).

²⁸ SB 1477 (Public Utilities Code 921.1).

Key Initiatives

PG&E's key initiatives for 2018 included advocacy for new or updated sections of California's Building Energy Efficiency Standards and related ASHRAE and ICC activities;²⁹ advocacy for new Title 20 and DOE appliance standards, and related ENERGY STAR® activities; training, tools, and resources to support compliance with existing C&S; development of new cost-effectiveness studies to support local government RC; long-term planning and coordination activities to optimize work across California's utilities; and CR activities aimed at specific industries and technologies for future code cycles.

Opportunities Moving Forward

As the focus on grid harmonization increases, it is necessary for the Standards to encourage commercial buildings' electrical systems to be ready for integration with renewables, storage, and respond to signals from the electrical grid. It is likely that integration of on-site generation, storage and efficiency measures will continue into the next several code cycles as statewide commercial building 2030 ZNE goals and GHG reduction goal milestones near. As all building types approach ZNE and state zero carbon emissions goals evolve, a greater percentage of C&S program efforts will need to be focused on integrating efficiency measures with distributed energy resources, generally funded in non-EE proceedings. This area of work will be critical to advance in the next three code cycles.

There is still significant room for improvement in the Building Energy Efficiency Standards and supporting compliance tools, with a specific need to address multifamily buildings, which represent a significant percentage of new housing being constructed to address California's affordable housing needs. This expected increase in construction is an opportunity to build energy efficient dwellings that can contribute to state energy goals. In the 2022 code cycle, the requirements for multifamily buildings may be extracted from the various sections in which they are found and consolidated into a dedicated section that will better serve the needs of this segment of the built environment. PG&E will work to ensure that revisions and additions to the prototypes used for multifamily energy models reflect current building practices.

PG&E also sees the opportunity to promote balance between the stringency and accessibility of code, boosting compliance rates. The CI program will continue to simplify and automate the compliance process through development of dynamic, digital tools that automate and verify compliance for market actors. Throughout 2019, PG&E will update the existing Title 24 training, tools, and resources, and preparing industry for implementation of the 2019 Standards while supporting industry in completing projects permitted under the 2016 code cycle. Additionally, PG&E will continue identifying and reaching key market actors in the Title 20 compliance supply chain with whom PG&E may build relationships and pilot new performance solutions.

In 2019, PG&E will look to overcome the significant barrier of short reach code "shelf lives," typically driven by slow turnaround of cost-effectiveness assessments. The subprogram continues to work closely with the local governments, obtaining input along the way to ensure the studies meet jurisdiction needs. Opportunities exist to develop tools that increase the value of RC to cities and perhaps advanced RC that better prepare the market for new codes.

²⁹ ASHRAE is the American Society of Heating, Refrigerating and Air-Conditioning Engineers. ICC is the International Code Council.

Additionally, PG&E has historically faced challenges obtaining jurisdictional data to analyze the impacts of adopted RC. PG&E recognized that because all RNC projects must complete at least one HERS-verified measure, the HERS Providers could be a potential source to collect data for ordinances with this scope. The RC subprogram began working with CalCERTS in 2018 to collect and process data regarding RNC ordinances. This data will be analyzed in 2019 and tailored reports will be provided to individual jurisdictions. This collaborative effort is expected to encourage an increased perception of reach code value and adoption by local governments.

Codes and Standards Subprograms

Building Codes Advocacy Subprogram – California Building Codes: Title 24, Part 6

The Building Codes Advocacy subprogram supports California CEC's triennial efforts to update California's Building Energy Efficiency Standards (Title 24, Part 6) to include new requirements or to upgrade existing requirements for various technologies. Advocacy activities include the development of Codes and Standards Enhancement (CASE) proposals, research to provide data needed to advance EE C&S, and participation in public rulemaking processes. The subprogram also supports the CEC in making recommendations to the Building Standards Commission for updates to Title 24, Part 11 California Green Buildings Standards Code (CALGreen). The energy measures in CALGreen provide foundational elements for local energy ordinances or RC.

2018 Strategies and Successes

On Wednesday May 9, 2018, the Energy Commission adopted the 2019 update to California's Building Energy Efficiency Standards, which will apply to all new construction and major retrofit projects permitted on or after January 1, 2020. PG&E has been a participant in the code-setting process since EE building standards were first developed in 1970. PG&E is part of the statewide IOU team that supports the development of the building EE standards.

The IOUs supported the CEC's 2019 rulemaking by developing 40 building code proposals contained in 23 CASE reports. The 2019 final CASE reports and Results Reports, which compare what was proposed to what was adopted, are available online.³⁰ Expected savings from the measures that were supported through the 2019 Title 24 CASE reports submitted to the CEC are approximately 603 GWh/year, 3.2 million therms and 30 million gallons of water for each year's construction following the intended effective date of January 1, 2020.

Building Codes Advocacy Subprogram – National Model Codes: ASHRAE 90.1 and 189.1

PG&E advocates for national codes that support California by encouraging adoption of transformative technologies and construction processes. Alignment between national and state codes also helps reduce barriers to compliance by harmonizing the requirements across state borders. Organizations that work across multiple states, including California, can establish business practices that would result in less customization for the California market. Participation in the ASHRAE code update proceedings in support of increasing requirements within these model codes is important to close the gap between Title 24 and the model codes that other states adopt.

³⁰ <http://title24stakeholders.com/2019casetopics/>.



2018 Strategies and Successes

In the 2019 California building code update, the shift from a mixed technology baseline to a LED baseline for the indoor and outdoor lighting energy budgets resulted in the most significant EE advancement for the code cycle. Evidence for this update was provided by PG&E through participation in the ASHRAE 90.1 Lighting Subcommittee meetings, sharing findings from CASE research which provided market evidence that the 90.1 LPDs were also ready for a reduction.

The Building Codes Advocacy subprogram also invested in support of updates to the 2018 International Green Construction Code,³¹ resulting in updated energy savings requirements including: zero energy performance index based on source energy, and FDD requirements for buildings larger than 25,000 ft². Advocacy activities also resulted in water savings requirements, including hot water system distribution design and updated cooling tower water treatment requirements.

Starting in 2019, the support for the advancement of national model building EE codes will be reported through the newly established National C&S subprogram.

Appliance Standards Advocacy Subprogram

The Appliance Standards Advocacy (ASA) subprogram targets both state and federal standards and tests methods, including improvements to Title 20 Appliance Efficiency Regulations by the CEC, and improvements to federal appliance regulations and specifications by the DOE, EPA ENERGY STAR® Program, ASHRAE, and the Federal Trade Commission. Advocacy activities include developing Title 20 code enhancement proposals, participating in the CEC public rulemaking process and ASHRAE committees, collecting data to support IOU positions, submitting comment letters in federal standards proceedings, and participating in direct negotiations with industry. Additionally, the subprogram monitors state and federal legislation and intervenes, as appropriate.

In 2019, state and federal advocacy work will be split between the State ASA subprogram (focused on Title 20) and the recently approved National C&S subprogram (focused on DOE, Energy Star, and other national appliance standards).

2018 Strategies and Successes

The most significant effort in 2018 was the IOU's support for the DOE's Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) negotiations for commercial VRF test procedure and standard. This effort will ensure that VRF equipment is as efficient in the field as it is marketed to be. PG&E collaborated with DOE to demonstrate that equipment ratings could double the savings consumers would realize in their facilities. This collaborative effort between DOE and PG&E is expected to result in significant savings and equipment performance ratings.

³¹ Powered by ANSI/ASHRAE/USGBC/IES Standard 189.1, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings.



In 2018, several other ASA subprogram efforts were pursued at the state level. The IOUs provided material support to the CEC's adoption of the portable electric spas, compressors, and portable air conditioner standards. ASA subprogram staff participated in several CEC webinars and workshops and developed CASE studies for the CEC rulemakings on several products: (a) spray sprinkler bodies, (b) commercial & industrial fans and blowers, (c) expanded GSL definition, (d) solar inverter roadmap, (e) portable air conditioners, (f) compressors, (g) tub spout diverters, (h) low power mode and power factor roadmap, and (i) portable spas and pool pumps. The ASA subprogram also completed laboratory testing for residential and commercial clothes dryers and commercial VRF equipment, with results now being used to create or improve test procedures. CASE studies were also submitted to the CEC for portable air conditioners, hearth products, compressors, and general service fluorescent lighting.

The ASA subprogram advocated for changes to federal appliance standards through multiple efforts. Program staff researched and responded to specific issues related to federal rulemaking and specification processes conducted by the DOE and EPA ENERGY STAR® and participated in stakeholder meetings during rulemakings and specifications processes, resulting in 20 rulemaking advocacy letters issued in 2018.

Compliance Improvement Subprogram

PG&E supports increased compliance with adopted Building Energy Efficiency Standards and Appliance Standards. CI activities complement advocacy work by maximizing persistent savings from C&S advocacy activities. The CI subprogram targets market actors throughout the entire compliance chain, providing education, outreach, and technical support and resources to improve compliance with both building and appliance energy standards.

2018 Strategies and Successes

Throughout 2018, the CI subprogram continued to employ a systematic approach to enacting behavior change throughout the building and appliance efficiency supply chains. The three-pronged performance improvement approach addresses the essential elements of behavior change by providing: (1) training to provide the knowledge and skills necessary to comply, (2) outreach to increase awareness and motivation, and (3) tools and resources to empower people to take the desired action.

The work accomplished in each area reflects key market actors wants and needs to improve compliance communicated directly to the CI subprogram and was completed in close collaboration with the CEC. In 2018, PG&E delivered more than 191 classes, across eight modalities and dozens of roles. PG&E reached more than 4,970 students and achieved a 95 percent satisfaction rate and a 20 percent knowledge swing, on average. New virtual courses were launched including courses: (1) supporting the new AER Program, (2) designed to teach building industry the benefits of applying the performance compliance path over the prescriptive path, and (3) "Roll-up-your-sleeves" interactive three-hour sessions during which design professionals receive one-on-one coaching from experts on specific case scenarios. PG&E also conducted a needs assessment with architects and designers to help develop supportive tools and training focused on their needs.

PG&E continued to automate the Title 24 compliance process by launching a suite of nonresidential 2016 dynamic forms, developing drafts of the 2019 dynamic forms, and finalizing a user interface that the industry may use to complete lighting forms in a quick and consistent fashion. The forms work responds to industry's needs by significantly reducing the number of forms through consolidation, auto-populating to reduce work, and providing error checking to improve accuracy. The CEC will require the use of dynamic forms over paper based forms beginning January 1, 2020. Additionally, a comprehensive electronic library that the industry may access to answer over 500 questions was launched. A dynamic timeline tool that indicates which building and appliance efficiency code activities is also being developed. Along with new tools, an extensive series of notebooks were developed to aid designers and plans examiners in determining which mandatory measures are applicable to a project. PG&E also worked with subject matter experts to update the library of existing 2016 resources in preparation for implementation of the 2019 code cycle.

In addition to continually sending targeted messages, placing advertisements and articles, and maintaining the Energy Code Ace (ECA) website, the outreach team refreshed the CI subprogram's Comply with Me theme and hosted the first annual ECA conference in November 2018. The conference hosted more than 180 individuals representing all segments of the Title 24 compliance supply chain and provided opportunities for attendees to learn how to access and apply ECA tools, training, and resources to their common work scenarios. Additionally, the team created a comprehensive binder of quick code compliance guidance and ECA resources that was provided to each building department throughout the state.

PG&E also facilitated ECA participation in more than 50 Title 24 and Title 20 industry events and maintained the website, which currently has more than 7,000 registered users. In recent surveys conducted to determine training needs of permit technicians and design professionals, more than 86 percent of permit technicians surveyed indicated that they use ECA resources while more than 78 percent of design professionals surveyed said they visit the ECA site.

The Program also continued transitioning the Certified Energy Analyst (CEA) exam administration to CABEC while supporting exam proctoring and revisions. Additionally, the CI subprogram continued assessing the difference in the quality of the compliance documents submitted for permits by CEAs and energy consultants who are not certified. Study parameters were reviewed by the CEC prior to launching the analysis so that the findings may be used to support future adoption of CEA requirements. A new training course was developed to help prepare consultants on the CEA Exam. The course is designed to increase the familiarity with the code requirements and energy modeling evaluated in the exam.

The CI subprogram also continued to support Title 20 compliance by targeting key measures, defined as having high savings paired with low compliance, and those that are newly regulated. In 2018, the CI subprogram conducted needs assessments and developed work plans for: lighting, residential pool pump replacement motors, computers, and small battery charger systems (SBCS). Key measure-specific work has revealed program-wide compliance challenges. These challenges indicate that: (1) there is opportunity for retailers to be more engaged in the compliance process, (2) the CEC's appliance database could be an increasingly effective tool for compliance verification, (3) compliance and energy savings may not be a priority for large buyers, and (4) if compliance was an enhanced focus of code development, Title 20 regulation effectiveness could improve. The CI subprogram has begun addressing these barriers through measure specific factsheets, contractor training and conversations with major retailers.

Reach Codes Subprogram

In addition to state and national building codes, the C&S RC Program provides technical support to local governments that wish to adopt local energy ordinances (RC) that exceed statewide Title 24, Part 6 minimum requirements for new buildings, additions, or alterations. Reach code support for local governments includes research and analysis to establish performance levels and cost effectiveness relative to fundamental Title 24, Part 6 requirements by climate zone, drafting model ordinance templates to encourage regional consistency, assistance for completing and expediting the application process required for approval by the CEC, and supporting implementation once effective.

Many local jurisdictions have established goals within their Climate Action Plans to reduce energy use and GHG emissions from buildings through adopting and implementing local energy ordinances. Cities and counties are ramping up local action to meet the statewide goals. This has translated to a greater interest in RC as a path to achieve the goals. In recognition of reducing GHG emissions reductions as high priority, there is a shift in focus from solely reducing energy use, to targeting energy use reductions associated with carbon emissions. This shift has resulted in an increased level of interest in all-electric designs, both at the local level, and at the state. One of the state-level changes, adoption of the 2019 Standards which created an all-electric baseline, allows all-electric designs to comply with and exceed the code more readily.

2018 Strategies and Successes

2018 work included analysis and report development, technical support for local jurisdictions, reach code resource accessibility improvements, and other activities. PG&E completed the following cost-effectiveness studies: RNC: PV Plus Battery Storage, RNC PV Plus Heat Pump Water Heating, Residential Retrofits, and Nonresidential PV for new construction and major alterations. In addition, a memo summarizing the impacts of the federal tariff on PV panels on the overall cost-effectiveness of the results in the RNC Tiers 1 and 2 study was also completed and publicly posted on the subprogram public website.³²

For technical support of local jurisdictions, PG&E presented cost-effectiveness studies, consulted on options and opportunities, created a checklist for permit applicants, and reviewed and made recommendations on proposed ordinance structure, triggers, and language. Jurisdictions included Arcata, Berkeley, Chico, Davis, Fremont, Silicon Valley Clean Energy, Menlo Park, and the Counties of Marin and San Mateo. Analysis results were also shared with BayREN members.

³² <https://localenergycodes.com/>.

PG&E continued updating and adding content to LocalEnergyCodes.com, which contains all subprogram studies, as well as model ordinance and resolution language to support consistency across jurisdictions. PG&E added an interactive map feature to the site to display which jurisdictions have passed RC, and obtain information on the ordinance, study and resulting changes to the municipal code. A companion matrix listing all information contained in the map is also posted on the site to allow users to view the information in a different format, accessing all ordinances at once, and comparing similar ordinances. The website also contains links to other providers, state agencies, and other resources. From its launch in July 2017, the site has gained 243 registered users and has had more than 16,000 unique sessions. The Performance-Based Ordinances page is the most popular with 1,924 views, followed by the Resources page with 1,682 views in 2018. The table on the next page shows the top five studies, and the numbers of times each was downloaded in 2018:

File Name	2018 Downloads
2016 RNC Cost-Eff. Report - All-Electric Design, CALGreen Tiers 1 and 2	464
2016 RNC Cost-Effectiveness Report - CALGreen Tiers 1 and 2	414
Addendum to All-Electric Design Report (CZ 2, 3, 13)	320
2016 NRNC Reach Code Cost-Eff Report	281
CA RC - 2016 Standards (matrix of adopted ordinances)	278

Following the adoption of the 2019 Standards, local interest in RC accelerated rapidly, fueled by the desire to decarbonize the building sector. In response, PG&E planned and hosted three RC Best Practices workshops in October 2018. Workshops were held in Oakland, Irwindale, and San Diego, and had 102 attendees from 77 organizations, including 43 city or county staff. Presentations from the workshops were downloaded 292 times by the end of the year. In addition, an overview of the RC process and summary of options and opportunities shared after the workshop were downloaded 198 times in 2018. The presentations and materials continue to remain popular on the site with an additional 163 presentation downloads and 126 downloads of the other materials in the first two months of 2019.

Planning and Coordination Subprogram

The planning element of this subprogram includes long-term planning and scenario analyses, modeling of impacts from potential C&S program activities relative to California policy goals and incentive programs, development of business and implementation plans, responses to CPUC and other data requests, updating the incremental measure costs for C&S measures, and maintenance of a C&S savings database consistent with evaluation protocols.

The coordination element includes internal and external harmonization with other groups.

Internal activities have traditionally included collaboration with several departments:

(a) incentive, training, and DR programs; (b) policy, regulatory, and corporate affairs; and c) emerging technology and product teams. More recently, as building codes have begun to incorporate DG and batteries, coordination has expanded to strategy integration, DG programs, and others involved in grid management.

Since C&S impact the entire state and almost all building types, occupancy categories, and related technologies, external harmonization activities encompass: (a) CPUC, CEC, Air Resources Board, (b) other IOUs, municipal utilities, and utilities in other states, (c) national advocates such as ASAP, NRDC, Northwest Energy Efficiency Alliance (NEEA), Sierra Club, American Council for an Energy Efficient Economy, Earthjustice, National Consumer Law Center, Consumer Federation of America, (d) representatives of various manufacturing companies and industry groups such as AHAM, CTA, NEMA, AHRI, American Gas Association, and (e) water utilities and local governments, and (f) other parts of the CI supply chain: building inspectors, Title 24 consultants, Contractor State Licensing Board, and others.

2018 Strategies and Successes

With the current absence of a formal ZNE subprogram, the C&S Planning and Coordination subprogram has taken a lead role for coordinating the various EE and non-EE aspects necessary to effectively support customers and the building industry to meet the state's ZNE goals. The ZNE effort is not only limited to Title 24, but also supports the California Department of General Services' ZNE goals, schools (Prop 39), and the design and construction industry's efforts to meet the various ZNE goals.

To coordinate between the EE incentive programs and C&S, a study was conducted in 2018 to determine how data contained in a CASE report could be leveraged to develop a workpaper. By doing so, savings from measures not currently offered in the EE programs could be captured before the measure goes into code. The study also looked forward to the proposed 2022 CASE measures and identified gaps in the CASE study data collection process needed to create a successful workpaper. This coordination is expected to reduce the effort and cost in developing a workpaper and increase consistency in data collection.

Code Readiness Subprogram

The primary purpose of the CR subprogram is to accelerate achievement of state policy goals such as ZNE and SB 350 through building codes and appliance standards and long-term tactical planning, data acquisition, and industry outreach. Technologies and disruptive systems are demonstrated with the aim of collecting high-quality information and data needed to support improvement to C&S; specifically, cost-effectiveness, feasibility, and compliance efficacy. The subprogram targets and carries out education and training for key builders, designers, and suppliers within each specific industry.

The second objective, code-directed support for incentive programs, leverages C&S research (technology and market, cost-effectiveness, impacts on manufacturers, among others) conducted by the DOE, IOUs, NEEA, and others to accelerate the development of new measures for incentive programs. This CR subprogram also strives to develop and implement a more holistic data strategy that simultaneously improves the quality of program advocacy and decreases costs. Tactics include field research surveys, online data harvesting, laboratory testing, and more.

2018 Strategies and Successes

PG&E expanded and made progress on tactical planning activities in 2018. Two key elements of tactical planning involve development of a research measure package (defined package of measures and minimum performance specifications for each) and building simulations to establish current Title 24 baselines and future code cycle goals for the measure packages that achieve ZNE goals by 2030. Modeling and simulation for a typical non-residential prototype was completed in early 2018.

Interim regulatory objectives for the next three Title 24 code cycles (2022, 2025, and 2028) were updated for initial priority measures such as DOAS and VRF systems, based on early research results. Various CR subprogram approaches, tools, and processes were refined or standardized. A central long-term data storage solution was also built to capture and quality-assure project monitoring data from the eight projects producing monitoring results in 2018.

Field research activities also expanded in 2018. PG&E completed monitoring and final reporting for two RNC projects that began in 2016. These projects demonstrated the effectiveness of various energy efficient construction and equipment strategies, including a CO₂ HPWH and advanced residential envelope construction strategies, that can be used to achieve efficient homes. Monitoring research through 2018 at the CR subprogram's first office retrofit project provided significant insights on the performance of measures, including power over Ethernet LED lighting, DOAS, and VRFs. Calibrated building energy models showed savings of 56 percent relative to the Title 24, Part 6 2016 code baseline for this project, while occupant surveys documented high levels of satisfaction with the new building systems. Building off the success of the first CR subprogram commercial retrofit project noted above, recruitment began for additional commercial retrofit sites. Two commercial retrofit projects were recruited for construction in 2019.

In 2018, recruitment efforts commenced for a field monitoring assessment of existing DOAS and VRF installations to establish an interim code step. Five nonresidential buildings joined the study and were outfitted with monitoring equipment to measure system performance. Final monitoring results will start arriving at the end of 2019, with additional monitoring sites to be added in 2019. Work also continued on a roof-top unit economizer research and field study intended to improve code baseline assumptions. Due to challenges with recruiting an unbiased sample, progress was slower than anticipated, pushing the expected completion date of the research project into 2019.

PG&E is working with the Applied Technology Services (ATS) laboratory to test prioritized appliance equipment categories. Seven categories were identified in 2017 (residential water heaters, commercial ACs, residential dryers, residential HVAC, commercial boilers, DOAS, and air-to-water heat pumps). Testing plans for the first group of products were launched in 2018, with results expected to inform the future advocacy efforts with respect to test procedures and standard updates, including for the DOE, ASHRAE, and AHRI test procedures. In 2018, testing was completed for residential clothes dryers and residential mini-splits, and significant progress was made on VRFs and residential furnaces. ATS test results from VRFs alongside field monitoring data from the office retrofit project provided pivotal VRF performance data that allowed PG&E and other stakeholders to support accurate test method development in a recent federal process directed by the DOE.

In 2018, the program began to pursue multifamily research projects and recruited one site to test the application of HPWHs in a central water heating configuration, as well as assess the performance of certain grid-interactive HPWH control strategies. The CR subprogram began coordinating with the CMFNH program to develop a CR overlay program element that would recruit a select subset of CMFNH program projects to also participate in additional CR subprogram measures and data collection. Similarly, the CR subprogram collaborated with the SBD program to offer a SBD CR overlay that would recruit a select group of SBD projects to participate in additional measures, performance monitoring, and other data collection.

Workforce Education & Training

PG&E's WE&T Program provides people who design, build, operate, and maintain buildings and building systems the relevant skills needed to eliminate unnecessary building energy use. WE&T teaches the energy workforce the best practices to save energy.

PG&E continued to demonstrate leadership in the local, state, and national EE workforce arenas in 2018. While administering three WE&T subprograms—Planning, Centergies, and Connections—PG&E's WE&T team collaborated with and provided technical advice to local workforce development organizations, educational institutions, and building trades training programs. PG&E also presented at local and national workforce development and technical conferences and served as technical advisors to PG&E resource programs and to external industry groups.



Key Initiatives

On-Demand Training

2018 was the first full year of the re-launched WE&T on-demand, web-based training platform. Over 1,300 registrations occurred in 2018. PG&E launched a new on-demand building science fundamentals series in March of 2018, adding eight additional classes to the platform and bringing the total number of WE&T on-demand classes to 40. To strengthen training offerings, PG&E conducted a comprehensive gap analysis of existing training, identifying over 20 topics for future on-demand development. Many of the identified topics leveraged in-house subject-matter expertise, existing training material, and previous classroom recordings. PG&E also contracted with an instructional design firm to begin developing six additional courses scheduled for release in early 2019.

Leveraging on-demand resources to support additional PG&E programs, part of an 8-day recurring series conducted at the Stockton Energy Training Center (ETC) on behalf of the ESA Program was converted to on-demand training. This resulted in a blended learning experience for the participant that required five days of in-person training, thus reducing the time and travel costs associated with ESA contractor training. In 2019, PG&E will continue to leverage available on-demand resources to support other PG&E programs, with primary focus on opportunities to support the EE portfolio.

Technical Advisory Committees

To assure that WE&T addressed the right topics and reached the right audience, the Energy Centers formed and leveraged Technical Advisory Committees (TAC) in 2018, consisting of a PG&E track lead and industry experts. TAC outcomes included key operational initiatives, such as effective marketing through professional organizations, ideas for new classes that focus on high levels of energy savings, and HVAC technologies gaining industry acceptance among the design engineering sector. Based on the success of the initial TAC, we created a job aid to help other track leads convene TACs. PG&E will continue to leverage TACs as part of the effort to reach the right audience with the right classes.



2018 Strategies and Successes

2018 was a year of delivering educational programs, technical advice, community outreach, and lending library tools to a diverse set of building professionals who have the potential to design, build, and operate in ways that will save energy in the short and long term. 2018 was also a year of transitioning from the pre-Business Plan WE&T to a restructured WE&T Program that would expand reach, be more cost-efficient, serve the right audiences, and achieve the outcomes outlined in the Business Plan.

Opportunities Moving Forward

2018 was a year of collaboration, as the WE&T team engaged its IOU counterparts to assess opportunities to share information and resources. Beginning in late 2018 and spanning into 2019, collaboration will first focus on sharing subject-matter expertise, training content, and development resources for areas of common interest among IOUs. For example, an Introduction to Programmable Logic Controls class began conversion into an on-demand class with SCE providing the subject-matter expertise and PG&E providing instructional design and development resources. The final on-demand class will be deployed separately by PG&E and SCE on each IOUs' respective on-demand training platforms.

In 2018, WE&T underwent organizational and operational changes to align itself with and to deliver on the revised WE&T Program outlined in the PG&E Business Plan. PG&E emphasized targeting and teaching to the right audience by adopting a statewide-consistent list of professions that have the highest potential to achieve energy savings in commercial and residential projects. PG&E also began collecting additional information about training attendees, including residential zip codes, to track the number of disadvantaged workers served.

Moving towards implementing goals and strategies outlined in the Business Plans, PG&E communicated with over 40 potential bidders for the two third-party WE&T solicitations—Career Connections and Career & Workforce Readiness (CWR)—that will be issued in Q3 2019. Career Connections will support K-12 teachers and organizations training future generations of the energy workforce. CWR will support disadvantaged workers to enter the energy workforce. CWR is a new subprogram that has received support from various WE&T stakeholders.

PG&E will also increase focus on collaborating with other organizations that expand program reach through joint training materials development and dissemination, and through training materials sharing to new audiences. In past years, PG&E has fostered relationships with local union training programs and workforce development organizations. Moving forward, PG&E will continue to seek and establish additional opportunities to collaborate with external organizations that can help expand program reach to the right members of the energy workforce.



WE&T Subprograms

WE&T Planning

WE&T Planning develops the framework for planning, coordinating, and implementing WE&T activities, partnerships, and recommendations to meet WE&T goals. WE&T Planning also contributes to shaping and defining Program goals and metrics, in addition to making subprogram modifications to evaluate and incorporate market and stakeholder demand.

2018 Strategies and Successes

In 2018, PG&E led the effort across IOUs to refine and clarify the WE&T Business Plan metrics. Pre-BP metrics were outputs-based—number classes, tool loans, outreach events, and consultations. The new BP metrics are more outcomes-based and track collaboration with other organizations, the total EE workforce reached, and how well disadvantaged workers are served by WE&T.

In December 2018, PG&E hosted the statewide WE&T Stakeholder Engagement Forum, *“Collaborations and Partnerships to Train Today’s and Tomorrow’s California Energy Workforce.”* The forum included panelists from The Energy Coalition, Northwest Energy Efficiency Council, Alameda County Workforce Development Board, USNRG Inc., San Diego Workforce Partnership, and Los Angeles Trade Technical College. Panelists shared their thoughts and experience on barriers to educating the energy workforce, barriers, and successes in partnering with other organizations to train the workforce, serving employers that need well-trained workers, and serving members of the workforce with socioeconomic barriers.

Anticipating the mid-2019 launch of the PG&E-led Statewide Career and Workforce Readiness (CWR) and Career Connections Third-Party Solicitations, PG&E led the effort to proactively find and reach out to potential implementers to inform them about the two solicitations, intended outcomes, the solicitation process and timeline, and how to remain informed about the solicitation. This outreach is expected to improve the pool of solicitation responses.

PG&E also participated in several workforce symposia and panels, including:

- Statewide EE Collaborative Forum
- Greenlining’s Bay Area Convening: Sustainable Infrastructure Jobs for Populations with High Barriers to Employment
- California Workforce Investment Board’s Industry Convening for AB398 Climate and Workforce Conversation with Business Leaders
- VERGE Conference panel on Workforce Development in California’s Clean Economy
- Office of Naval Research Partners Graduating to an Energy Career Panel

Participating in these events affirms that PG&E is part of the EE workforce education and training community. It also establishes a vital feedback loop that keeps PG&E informed about issues that are important to stakeholders.

WE&T Centergies

The Centergies subprogram consists of three Energy Centers—the Pacific Energy Center (PEC) in San Francisco, the ETC in Stockton, and the Food Service Technology Center in San Ramon. Centergies targets the incumbent EE workforce in several market segments, including agriculture, foodservice, commercial, industrial, and residential. Centergies provides in-person and web-based education and training programs, technical advice, outreach events, and building performance tool loans.

In the Business Plan, Centergies was renamed “Integrated Energy Education & Training (IEET).” IEET will continue to upskill the incumbent workforce and will expand to support post-secondary education organizations that are training the incoming workforce.



The number of classes and services offered are summarized in the table below.

2018 Classes, Attendees, and Tool Lending Library Activity

Number of Classes	Number of Attendees	Number of Tool Loan Transactions / Number of Tools Loaned	Number of Distinct Tool Lending Library Projects
494	12,489	764 / 8892	556

2018 Strategies and Successes

In 2018, the Energy Centers focused on delivering high-quality and industry-relevant classes, outreach events and tool loans that prepare California’s building industry to meet the state’s energy and climate goals. PG&E implemented continuous improvement initiatives aimed at improving student records and decreasing the average cost per student, including engaging instructors in marketing efforts, simulcasting additional classes, and increasing the number of classes that leverage existing industry events with a broader audience.

PG&E increased focus on redesigning and proactively canceling classes with high per student costs and/or low turnout. To improve access for target audiences, training associated with the TLL was expanded and training tracks began reorganization through course catalog development and consistent graphic representation of classes. PG&E also led efforts across the IOUs to standardize a list of class topics and event definitions that all IOU energy centers will use in 2019. To expand and broaden access and participation within target audiences, PG&E developed a comprehensive marketing plan that includes Spring and Fall class calendars, enhanced weekly email promotions and expansion into social media promotions via LinkedIn. To save paper and to reduce manual tabulation of survey responses, class tracking switched from paper to Survey Monkey for post-course evaluations.



In 2018, PG&E continued to expand and enhance the capabilities of myTurn, a cloud-based tool reservation and tracking system, including streamlining the reservation and fulfillment process and tracking calibration schedules. Customer-facing improvements included allowing the borrower to request help with selecting the appropriate tool, linking specific tools and their accessories, and featuring tools that are new or most relevant to borrowers. Adoption and implementation of myTurn was completed at the Stockton Energy Center, and tool-borrowing customers are now able to pick up any tool at the PEC in San Francisco and the ETC in Stockton.

WE&T also identified and evaluated training needs within the EE Portfolio to improve solicitation bidder awareness and implementer on-boarding. This supports the launch of a “Training as a Service” initiative to address these needs with the goal of serving as a positive and proactive business partner to the EE Portfolio, ESA program, and SJV DAC by creating learning solution proposals and delivering corresponding training. Training as a Service benefits the EE Portfolio by incorporating adult learning principles, consistent branding and aesthetics, and ADA design requirements.

In support of PG&E’s broader wildfire rebuild effort, WE&T collaborated with the Energy and Sustainability Division of the County of Sonoma’s General Services Department, County of Marin Community Development Division, and SCP to bring EE and renewables classes to Santa Rosa and support energy-efficient rebuilding. The collaboration targeted homeowners, residential designers, builders, and HVAC and plumbing professionals.

WE&T Connections

The goal of the Connections subprogram is to develop, inspire, and train future generations of the energy workforce. Connections provides teaching and career information resources to kindergarten through postsecondary teachers and students to educate and inspire students on topics such as energy, EE and sustainability education, green career awareness and experiences. Connections also informs students about career and education pathways in the energy sector and provides students with career exploration opportunities.

Connections has three components to address differences in grade level needs:

- PEAK Student Energy Actions (PEAK) teaches K-8 students how to manage energy use at their homes and schools and inspires students to pursue green careers.
- Energize Schools provides teacher training and prepares high school students for energy careers and higher education programs through project-based sustainability curriculum and student-led action projects.
- Energize Colleges provides students transferrable career skills through project- and work-based learning opportunities, and supports faculty in developing project-based courses, certificates, and degrees on topics, including EE, DG and DR.

2018 Strategies and Successes

In 2018, Connections focused on increasing the percent of Title 1 schools served, developing collaborations, and identifying ways to support teachers and organizations to independently continue to implement program materials in future years. Connections served over 100,000 K-12 students at 742 schools. 78 percent of those schools were Title 1 schools or had more than 40 percent of students enrolled in the free-and-reduced-price meal plan. Connections also supported students and faculty across 5 college campuses.



In 2018, PEAK increased train-the-trainer efforts to more cost-effectively reach additional students. PEAK also provided UC Merced students with the training and opportunity to complete university-required fieldwork hours with PEAK curriculum participation. Students were trained and placed in PEAK-enrolled school sites, increasing educator engagement, and providing students with fieldwork experience. Other organizations like Lindsay Wildlife Museum and Chabot Space and Science Center also participated in the Field Educator Model. Collaborations will continue into 2019 by training student leads at each location, who will in turn train the next set of students.

Energize Schools supported teachers and worked with elementary school students to increase green education and career pathway opportunities. Energize Schools coursework fulfills Career and Technical Education standards and helps students meet UC admissions requirements. Abraham Lincoln High School in San Francisco began implementing Energize Schools curriculum in 2017 and received additional instructional support for hands-on activities from Energize Schools in 2018. An Abraham Lincoln HS Green Academy instructor and her classroom benefitted from additional support with the hands-on solar USB charger and building a mini-generator projects. Students learned about electricity fundamentals, energy generation, electrical circuit wiring, energy auditing, green building design, renewable energy sources, and gained experience soldering, a transferable career skill. The Lincoln HS Green Academy instructor is now able to implement these activities independently in the future.

The Energize Schools Energy Conservation Competition helped students learn about various EE topics, provided students EE work experience, and helped to foster relationships across schools. High school students from 14 campuses within PG&E's territory identified over 10,000 kWh in energy savings opportunities as part of a cash prize competition for the school that could save the most energy. Energize Schools presented an award to Yosemite Continuing Education High School in Merced for supporting neighboring Ada Givens Elementary School's effort to create a conservation campaign that included an empowering message about students changing the world.

Fifty-seven Energize Colleges student interns collaborated with high school students to inspire and train future generations of the energy workforce while strengthening their own career experiences. Some interns taught and presented to local high school students while others lead tours of their colleges. College of Marin interns conducted energy audits and produced energy forecasts for their college's six new buildings. One intern also supported campus tours and events for high school students on career exploration and solar technology.

PG&E envisions a workforce capable of meeting California's energy savings goals and implementing its demand side management programs. Whether for current EE professionals, for students who are a few months from entering the workforce, or for future generations of the energy workforce, WE&T has a rich portfolio of resources to support that vision and will continue to evolve those resources to address technological changes and workforce needs.

Financing Program

PG&E's EE Financing program is designed to help customers finance the up-front cost of EE projects. The statewide financing program is offered in conjunction with other PG&E EE programs to stimulate and enable higher levels of customer participation.

Key Initiatives

On-Bill Financing Program Improvements

2018 saw market adoption of OBF without the need for incentive program participation, affording project developers and customers more flexibility in how they implement their projects. This flexibility allows customers to get measures tailored to their needs and drive the process and timeline themselves. There were more than 70 loans initiated using this new process by the year end, with growth expected to continue into 2019.

Financing Pilots

Throughout 2018, PG&E and the statewide Financing team worked closely with Commission Staff, the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA), and the Center for Sustainable Energy on the development of the Statewide Finance Pilots. 2018 saw the continued growth of the Residential EE Loan assistance program and the creation of the Small Business Finance Program.

2018 Strategies and Successes

PG&E's EE Financing subprograms facilitate portfolio energy savings by allowing customers to pursue large, comprehensive efficiency retrofit projects that might not have been financially feasible otherwise. In 2018, the OBF Program maintained its strong growth in financed projects, totaling 781 loans issued for a total of \$37.8 million. PG&E has also continued collaborative efforts with the statewide IOUs and CAEATFA, to develop financing pilots that will offer more flexible terms to a broader array of customers.

PG&E's EE financing subprograms allow customers to pay for their EE projects as they save money on their energy bill. Doing so allows them to undertake more comprehensive projects and, in some cases, projects that would not have been feasible without financing.

PG&E's OBF Program Continues Growth

In 2018, PG&E maintained the success of the OBF program while making significant investments to improve processing time and scalability for the future.

OBF delivered 781 loans across the agricultural, commercial, institutional, industrial, and multi-family sectors in 2018, 41 percent over the 553 loans extended in 2017.





In 2018, PG&E filed a PFM of D.09-09-047 Concerning OBF, seeking permission to expand the loan limits and update the contract terms of OBF projects. In March 2019, the Commission approved PG&E's PFM in D.19-03-001, granting PG&E the ability to offer all qualifying non-residential customers loans of \$250,000 per premises with exceptions, and up to \$4 million for unique energy savings opportunities.³³ This change will enable expanded projects across many of PG&E's diverse customer sectors with the potential for greater energy savings.

Opportunities Moving Forward

PG&E will seek to establish a market-led engineering review process to give project developers more freedom to control the process of obtaining OBF loans. This will enhance OBF's value as a tool for increasing investment in EE, and the realization of related savings, across the PG&E service territory. Faster project implementation is expected to drive increased customer interest and uptake from channel partners.

For 2019 and beyond, PG&E envisions continued growth and adoption of the use of OBF, with a plan to double the amount of OBF funds lent in 2019 as compared to 2018. As the portfolio evolves in line with PG&E's Business Plan goals, OBF is expected to be an increasingly important delivery mechanism for the EE portfolio.

Financing Subprograms

On-Bill Financing

OBF is a key enabler of energy savings across customer classes, providing zero percent financing for qualifying EE retrofits, with loan payments appearing as fixed monthly charges on the customer's PG&E bill. OBF helps customers, who would otherwise have difficulty qualifying for commercial credit, get over the first-cost hurdle to EE investment, unlocking broader and deeper cost savings while supporting PG&E's energy savings targets.

2018 Strategies and Successes

In 2018, the OBF Program issued more than \$37 million in new loans to 781 customers. Overall, OBF saw a 41 percent increase in total loan volume and 56 percent increase in the total funds issued as compared to 2017.

Financing Pilot Subprograms

The IOUs have developed a set of statewide Financing pilot subprograms designed to encourage private lenders to offer financing products specifically for EE projects by offering both credit enhancements (CE) in the form of loan loss reserves, and the option of loan collection by the utility on behalf of the lender (On-Bill Repayment or OBR).

³³ D.19-03-001.



The pilots include ratepayer-supported CE for residential properties and small businesses. The CEs are expected to provide additional security to third-party lenders and private capital, intended to extend or improve credit terms for EE projects.

- In 2018, the State Treasurer's Office created the Small Business Finance program with regulations adopted in December. The first loans issued under the Small Business Finance program are anticipated early 2019.
- The Residential Energy Efficiency Loan program continued to grow with over \$3 million lent in 2018.

Third-Party Financing

PG&E funded two ARRA continuation subprograms. The emPower SBC Program is administered by the County of Santa Barbara and is a joint co-funding effort between PG&E, SCE and SoCalGas. The subprogram leverages ARRA funding to create a public-private partnership between the County of Santa Barbara, all eight incorporated cities, the Home Upgrade Program, and two local credit unions. 2018 was the final year of the program. The program was closed due to low participation and other financing options and programs being made available in the central coast region.

The Golden State Finance Authority Loan product uses a loan loss reserve to make financing available specifically for EE projects. The loans are available across the PG&E territory and can provide up to \$50,000 of funding to customers at affordable rates. The subprogram is important as it provides an option for customers looking to perform whole house retrofits under the Advanced Home Upgrade Program.

Integrated Demand-Side Management

The Strategic Plan was originally established in 2009 and recognizes the integration of DSM options, including EE, DR, and DG, as fundamental to achieving California's strategic energy goals.³⁴ To support that initiative, the IOUs identified IDSM as an important strategic DSM policy priority and engaged in a series of activities, pilots, and other subprograms in response to the Strategic Plan DSM Coordination and Integration Strategy.

Looking forward to the evolving focus of IDSM, as directed by the CPUC,³⁵ which prioritizes assisting customers in preparation for transitioning to time-varying electric rates, the IOUs have leveraged the statewide IDSM initiatives to create integrated and cost-effective approaches to scale energy savings.

In 2018, the statewide IDSM program focused on the following initiatives:

- 1) Development of a proposed method to measure cost-effectiveness for integrated projects and programs including quantification and attribution methods that includes GHG and water reductions benefits and the potential long-term economic and electric/gas hedging benefits.
- 2) Development of proposed measurement and evaluation protocols for IDSM subprograms and projects.
- 3) Review of IDSM-enabling ET for potential inclusion in integrated programs.
- 4) Development of cross-utility standardized integrated audit tools using PG&E's developed audits as a starting point.
- 5) Tracking of integration pilot programs to estimate energy savings and lessons learned and develop standard integration best practices that can be applied to all IOU programs based on pilot program evaluations and the results of additional integration promoting activities (e.g., EM&V and cost-benefit results).
- 6) Development of regular reports on progress and recommendations to the CPUC.
- 7) Organizing and overseeing internal utility IDSM strategies by establishing internal Integration Teams with staff from EE, DR, DG, marketing, and delivery channels.
- 8) Providing feedback and recommendations for the utilities' integrated marketing campaigns including how the working group will ensure that DR marketing programs approved as Category 9 programs are coordinated with EE integrated marketing efforts.

Achieving IDSM Objectives

PG&E continues to work towards taking a holistic approach to customers' needs when offering potential solutions to customers. Collaboration is a focus amongst many different internal departments including EE, DR, rates, customer support, emerging technology, electric vehicles, net metering, energy assistance and others to develop the offer the right solutions, to the right customer, at the right time. PG&E continues to emphasize the importance of this approach throughout the organization.



³⁴ D.09-09-047.

³⁵ D.18-05-041.



2018 Strategies and Successes

Statewide IDSM

The IOUs have developed well established processes ensuring delivery of integrated messaging via marketing, education, and outreach to residential and business customers. In 2018, the statewide IDSM Task Force completed the following activities related to the eight directives provided in D.09-09-047:

- Directives 1 & 2 – The Task Force explored a phased approach to developing an appropriate methodology to calculate integrated cost-effectiveness and an integrated EM&V approach for IDSM programs and projects. Integrated Cost Effectiveness Research will establish the data needs to inform the understanding of integrated cost effectiveness for IDSM programs and projects. An integrated cost-effectiveness and EM&V whitepaper was developed in 2018, with work scheduled to begin in 2019. The whitepaper is expected to document how the IOUs and the CPUC's Energy Division document and attribute energy savings and demand reduction to IDSM project implementation, using methodologies established from evaluation.
- Directives 3 & 5 – The Task Force tracked multiple integrated ET and reviewed various programs, projects, IDSM Pilots and activities to identify integration efforts and opportunities, as well as to develop best practices.
- Directive 4 – The statewide online integrated audits team continued to coordinate to deliver a consistent online integrated audit tool that works with each IOU interface and educates customers on managing their energy use costs. The IOUs created online integrated audit tools for residential and small to medium size business customers with customized audit recommendations based on customer profiles, operating characteristics, market sector potential, and cost-effectiveness. The IOUs also enhanced existing integrated tools to include solar-related functionality, and continued to offer on-site integrated audits to small, medium, and large customers.
- Directive 6 – The IOUs submitted four joint quarterly reports for 2018, including an Executive Summary section, to provide Energy Division staff with updates on the eight IDSM directives. All quarterly reports were uploaded and available for viewing on the California Energy Efficiency Statistics Data Portal (EE Stats).
- Directive 7 – The Task Force held regular coordination phone calls to continue to ensure alignment across the state and discuss lessons learned.
- Directive 8 – Delivery of IDSM marketing continued to be more than just promotion of multiple programs within specific tactics like collateral or websites. It is a key component in the planning phases of integrated ME&O to help provide the right solutions to the right customer, at the right time. The Task Force tracked, reported, and shared best practices related to local integrated marketing campaigns for residential and business customers.



PG&E's IDSM Efforts

PG&E's 2018 IDSM efforts focused on providing thorough training to staff regarding IDSM objectives. The cornerstone of the training program was for PG&E to host the annual IDSM summit in April 2018 to increase knowledge and awareness on integrated approaches, meet regulatory compliance directives, and to promote communication between all divisions and departments. Account representatives and select program advisors were also encouraged to emphasize customer segmentation in their approaches.

PG&E continued integrated marketing campaigns throughout the year for business and for residential / smaller business customers. Furthermore, PG&E's EE and ESA teams partnered to offer multifamily property owners and occupants a dedicated resource to assist in identifying the best products and programs for their homes and buildings. The Multifamily SPOC coordinates a wide range of PG&E and other public program resources and assists building owners and occupants in accessing such resources as EE, DR, and DG, Pricing Products, and Electric Vehicle incentive programs.

From an IDSM technology perspective, PG&E continued to scale demand-response-enabled programmable-communicating thermostats offerings in both residential and commercial customer programs. Additionally, technical support for the design and energy performance monitoring of ZNE packages as part of the Prop 39 ZNE Pilot Program continued, with two schools completing full package installation, a third completing partial package installation, and two schools completing a year of energy performance monitoring. PG&E and the other IOUs coordinated with the New Building Institute to offer in-person trainings and webinars on best practices for ZNE schools retrofits.

ZNE Builder Demonstration efforts were ongoing, with a year of energy performance monitoring completed at three homes, and ZNE outreach efforts were conducted in coordination with the AER program for wildfire victims in the Santa Rosa area. Energy performance monitoring for a pilot ZNE home completed in 2013, used as a model home and sold in 2017, was initiated. The annual Architecture at Zero competition³⁶ was launched with a site at CSU, Monterey Bay and a panel of expert judges.³⁷ A third volume of ZNE case studies, "Zero Net Energy Case Studies, Volume 3," was completed in 2018 and is now available as a free PDF³⁸ or for purchase in print.

³⁶ <http://www.architectureatzero.com/>.

³⁷ <https://csumb.edu/news/csumb-selected-host-architecture-zero-competition-2019>.

³⁸ https://www.pge.com/pge_global/common/pdfs/save-energy-money/savings-programs/zero-net-energy-program/ZNE-Case-Study-Buildings-Vol3.pdf.



Opportunities Moving Forward

To help customers prepare for the rollout of time-varying electric rates over the next several years, PG&E began development of its 2019 and future year IDSM program offerings by taking several steps to prepare EE Programs for the integration of automated DR and TOU technologies and education. In 2019, PG&E will offer IDSM programs through existing residential and commercial programs—the Middle Income DI, P4P Pilot, and the Commercial Calculated Incentives programs, rather than the historically distinct Statewide DSM Coordination and Integration program.³⁹ This new framework will enable increased uptake and adoption of integrated solutions.

Additionally, PG&E invited bidders to propose IDSM solutions in the Third-Party EE Programs RFA that was released in November of 2018. The RFA allowed bidders to propose EE and DR integrated solutions for both the residential and non-residential sectors.⁴⁰

³⁹ Pacific Gas and Electric Company Advice 4011-G/5375-E, Page 6.

⁴⁰ https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-efficiency-solicitations/RFA_General_Instructions.pdf.



Tables and Appendices

Section 1 Energy Savings

Table 1

Electricity and Natural Gas Savings and Demand Reduction (Net)

Annual Results	2018 Installed Savings	CPUC 2018 Adopted Goals (D.17-09-025)	% of Goals (2018)
2018 Energy Savings (GWh) – Annual			
PG&E	1,288.1	983	131%
TOTAL Energy Savings (GWh) – Annual	1,288.1	983	131%
2018 Energy Savings (GWh) – Lifecycle			
PG&E	15,268		
TOTAL Energy Savings (GWh) – Lifecycle	15,268		
2018 Natural Gas Savings (MMth) – Annual			
PG&E	30.0	31.0	97%
TOTAL Natural Gas Savings (MMth) – Annual	29.97	31.0	97%
2018 Natural Gas Savings (MMth) – Lifecycle			
PG&E	321		
TOTAL Natural Gas Savings (MMth) – Lifecycle	321		
2018 Peak Demand savings (MW)			
PG&E	342.7	204	168%
TOTAL Peak Demand savings (MW)	343	204	168%

- (1) All energy savings numbers are on a net basis, with 5 percent market spillover. Energy savings are based on the actual accomplishments recorded in 2018.
- (2) Installed savings for PG&E includes C&S, ESA Program; BayREN) and MCE as reported in their 2018 Annual Report, filed on April 15, 2019.



Section 2 Emission Reductions

Table 2

Environmental Impacts (Net)

Annual Results	Annual tons of CO2 avoided	Lifecycle tons of CO2 avoided	Annual tons of NOx avoided	Lifecycle tons of NOx avoided	Annual tons of PM10 avoided	Lifecycle tons of PM10 avoided
2018 Portfolio Targets	N/A	N/A	N/A	N/A	N/A	N/A
PG&E	313,782	3,510,100	203	2,274	41	488
2018 Total	313,782	3,510,100	203	2,274	41	488

- (1) Excludes ESA Program, BayREN, and MCE.
- (2) All Environmental Impacts are net with 5 percent market spillover.

Section 3 Expenditures

Table 3

All expenditure data can be found in the “PGE.AnnualExcel.2018.1.xlsx” spreadsheet, under Tab “T-3 Exp’s.” The spreadsheet can be accessed on the Energy Efficiency Statistics website at <http://eestats.cpuc.ca.gov/Views/Documents.aspx>. To access the 2018 spreadsheet, follow these steps:

- 1) In the Report Category, select Annual
- 2) Under Report Options, select 2018
- 3) In the Report Type, select Narrative and Spreadsheets
- 4) In Report Options, select PGE for Utility

Section 4 Cost-Effectiveness

Table 4

Cost Effectiveness (Net)

Annual Results	Total Cost to Billpayers (TRC) (3)	Total Savings to Billpayers (TRC/PAC)	Net Benefits to Billpayers (TRC) (3)	TRC Ratio (4)	Total PAC Cost (3)	PAC Ratio (4)	PAC Cost per kW Saved (\$/kW) (1)	PAC Cost per kWh Saved (\$/kWh) (2)	PAC Cost per therm Saved (\$/therm) (2)
PG&E 2018	\$892,827,524	\$1,273,909,219	\$381,081,694	1.43	\$307,106,602	4.15		0.20	1.83
PG&E TOTAL	\$892,827,524	\$1,273,909,219	\$381,081,694	1.43	\$307,106,602	4.15	\$ -	0.20	1.83

- (1) The adopted avoided cost methodology does not provide information to provide a meaningful value for PAC Cost per kW. The adopted avoided cost methodology created kWh costs values that vary for each hour of the year that includes kW generation.
 - (2) PAC cost per kWh or per therm is (PAC Cost x (Electric Benefits/Total Benefits)/net kWh) or (PAC Cost x (Gas Benefits/Total Benefits)/net therm) respectively per CET based definition provided by CPUC to PG&E via e-mail on April 8, 2016.
 - (3) The cost-effectiveness calculations are based on the actual accomplishments recorded in 2018.
- Includes:
- Includes ESPI payment of \$12.04M recorded in 2018 per Draft Resolution (Res.) E-4979, Table 13: PG&E 2018 ESPI awards (D.13-09-023), C&S costs and benefits.
 - Installed savings for ESA Program.
- Excludes:
- Excludes ESA, BayREN, and MCE Program costs and benefits.
 - Statewide ETP costs per D.12-11-015 (p. 52).
 - The Financing Program OBF Loan Pool amounts (loans issued and repaid) of \$15.85M for 2018 are excluded per D.09-09-047 (p. 288).
- (4) All savings values include 5 percent market spillover in cost-effectiveness calculations per D.12-11-015 (OP 37) including C&S.



Section 5 Bill Impacts

Table 5

Ratepayer Impacts

2018	Electric Average Rate (Res and Non-Res) \$/kwh	Gas Average Rate (Core and Non-Core) \$/therm	Average First Year Bill Savings (\$)	Average Lifecycle Bill Savings (\$)
PG&E Average	\$0.198	\$1.525	\$300,733,808	\$3,496,109,290
PG&E Average	\$0.198	\$1.525	\$300,733,808	\$3,496,109,290

Notes: (Consistent with SPM TRC/PAC/RIM tests, all savings used from actuals and forecasts in this table are net not gross)

- (1) Average first year electric bill savings is calculated by multiplying an average electric rate (as of 9/1/18) with first year net kWh energy savings.
- (2) Average first year gas bill savings is calculated by multiplying an average gas rate (as of 3/1/18) with first year net therm energy savings.
- (3) Total average first year bill savings is the sum of Notes 1 and 2.
- (4) Average lifecycle electric bill savings is calculated by multiplying an average electric rate with lifecycle net kWh energy savings.
- (5) Average lifecycle gas bill savings is calculated by multiplying an average gas rate with lifecycle net therm energy savings.
- (6) Total average lifecycle bill savings is the sum of Notes 4 and 5.
- (7) Total Average Bill Savings by Year and Lifecycle Bill Savings include C&S net savings and net lifecycle savings respectively; and includes ESA Program, BayREN, and MCE savings.



Section 6 Savings by End Use

Table 6

Annual Savings By Use Category 2018 Only^{(1),(2)}

Use Category	GWH	% of Total	MW	% of Total	MMTh	% of Total
Appliance or Plug Load	83.50	6%	10.93	3.2%	0.62	2.1%
Building Envelope	21.25	2%	4.77	1.4%	0.89	3.0%
Compressed Air	7.40	1%	0.55	0.2%	-	0.0%
Commercial Refrigeration	42.75	3%	7.12	2.1%	0.15	0.5%
Codes & Standards	37.20	3%	5.89	1.7%	-0.00	0.0%
Food Service	1.50	0%	0.23	0.1%	0.52	1.7%
HVAC	132.35	10%	49.18	14.4%	4.50	15.0%
Irrigation	12.07	1%	6.25	1.8%	-	0.0%
Lighting	542.26	42%	85.86	25.1%	-4.85	-16.2%
Non-Savings Measure	0.00	0%	0.00	0.0%	0.01	0.0%
Process Distribution	14.25	1%	2.46	0.7%	-	0.0%
Process Drying	-	0%	-	0.0%	-	0.0%
Process Heat	4.40	0%	0.52	0.2%	1.68	5.6%
Process Refrigeration	14.72	1%	1.54	0.5%	0.00	0.0%
Recreation	12.99	1%	2.61	0.8%	0.06	0.2%
Service	12.21	1%	1.09	0.3%	0.67	2.2%
Service and Domestic Hot Water	18.20	1%	0.90	0.3%	12.70	42.4%
Whole Building	330.92	26%	162.77	47.5%	13.01	43.4%
PG&E ANNUAL PORTFOLIO SAVINGS	1,288.0	100.0%	342.7	100.0%	29.97	100.0%

(1) All energy savings numbers are net with 5 percent market spillover.

(2) Includes savings for ESA Program; BayREN and MCE savings as reported in their 2018 Annual Report filed on April 15, 2019.

(3) ESA Program savings are included in Whole Building use category.

Section 7 Commitments

Table 7
Commitments⁽⁴⁾

Commitments Made in the Past with Expected Implementation after December 2010-2012				
	Committed Funds ¹	Expected Energy Savings		
2010-2012 ¹	\$	GWH	MW	MMth
Resource	N/A	N/A	N/A	N/A
Non-Resource	N/A	N/A	N/A	N/A
Codes & Standards	N/A	N/A	N/A	N/A
PG&E Total	N/A	N/A	N/A	N/A
Commitments Made in the Past Year with Expected Implementation after December 2015				
	Committed Funds ²	Expected Energy Savings		
2013-2015 ²	\$	GWH	MW	MMth
Resource	N/A	N/A	N/A	N/A
Non-Resource	N/A	N/A	N/A	N/A
Codes & Standards	N/A	N/A	N/A	N/A
PG&E Total	N/A	N/A	N/A	N/A
Commitments Made in the Past Year with Expected Implementation after December 2016				
	Committed Funds ³	Expected Energy Savings		
2016 ³	\$	GWH	MW	MMth
Resource	N/A	N/A	N/A	N/A
Non-Resource	N/A	N/A	N/A	N/A
Codes & Standards	N/A	N/A	N/A	N/A
PG&E Total	N/A	N/A	N/A	N/A
Commitments Made in the Past Year with Expected Implementation after December 2018				
	Committed Funds ³	Expected Energy Savings		
2018 ³	\$	GWH	MW	MMth
Resource	42,711,402.3	97.0	14.5	3.5
Non-Resource	N/A	N/A	N/A	N/A
Codes & Standards	N/A	N/A	N/A	N/A
PG&E Total	42,711,402	97.0	14.5	3.5

- (1) Note: Committed funds are associated with the 2010-2012 program cycle. These funds are reserved or encumbered for future work permitted per OP 13 and Conclusion of Law 12 of D.12-11-015.
- (2) Note: Committed funds are associated with the 2013-2015 program cycle. These funds are reserved or encumbered for future work permitted per the EESTATS CPUC Guidance Document and EE decision (D.15-10-025).
- (3) Note: Committed funds are associated with the 2016, 2018 program years, respectively. These funds are reserved or encumbered for future work permitted per the EESTATS CPUC Guidance Document and EE decision (D.15-10-025).

Committed Funds for 2018 include incentives related to PG&E EE projects committed in prior year(s) but not completed by December 2018.

- (4) Note: All energy savings numbers are on a net basis.



Section 8

Shareholder Performance Incentives

2018 requested and approved shareholder earnings are from EE activities performed in program years 2016 and 2017.

The mechanism and payment associated with 2018 program activities was based on the ESPI mechanism as approved in D.13-09-023. The ESPI mechanism is a multi-component incentive structure. The ESPI mechanism was established with the goal and objective to encourage and motivate IOUs to invest in EE programs that are quantifiable, as well as other non-quantifiable programs that help transform the market. The four components contributing to 2018 ESPI earnings are:

- 1) **Component 1:** A performance award for energy savings of up to 9 percent of the resource program budget (excluding C&S program budgets),
- 2) **Component 2:** A performance award for ex ante review activities of up to 3 percent of resource program budget (excluding C&S program budgets),
- 3) **Component 3:** A management fee for C&S programs of up to 12 percent of C&S program budgets, and
- 4) **Component 4:** A management fee for non-resource programs of up to 3 percent of non-resource program budgets.

PG&E filed an advice letter on November 20, 2018 requesting an award for certain EE Program Year 2016 and 2017 activities including custom projects, uncertain measures, and a true-up of the 2016-2017 incentive payment.⁴¹

The earnings requested in 2018 were issued in draft form on March 18, 2019 through Res.E-4979 in response to PG&E's Advice Letter 4044-G/5430-E, per direction from D.13-09-023. The table below provides the draft payment awarded to PG&E for program years 2016 and 2017.

The final shareholder incentive payment was impacted by the 2016-2017 True-Up and the 2006-2008 RRIM Adjustment, which adds \$0.01 million and deducts \$1.4 million, respectively, from the final incentive payment.

⁴¹ 2016 true-ups are for ex-ante savings, EAR performance, C&S, and non-resource incentive payments. 2017 true-ups are for EAR performance, C&S, and non-resource incentive payments.



2018 Requested and Draft⁴² Approved ESPI

Program Year for Activities Paid	Year Incentive Requested and Approved	DRAFT Authorizing Decision	Shareholder Incentive
2016	2018	Resolution E-4979	\$4.7M
2017	2018	Resolution E-4979	\$8.7M
2016-2017 True-Up	2018	Resolution E-4979	\$0.01M
2006-2008 RRIM Adjustment	2018	Resolution E-4979	-\$1.4M

**Section 9
Metrics**

All metrics data can be found in the “PGE.AnnualExcel.2018.1.xlsx” spreadsheet, under Tab “T-9 Metrics.” The spreadsheet can be accessed on the Energy Efficiency Statistics website at <http://eestats.cpuc.ca.gov/Views/Documents.aspx>. To access the 2018 spreadsheet, follow these steps:

- 1) In the Report Category, select Annual
- 2) Under Report Options, select 2018
- 3) In the Report Type, select Narrative and Spreadsheets
- 4) In Report Options, select PGE for Utility

⁴² PG&E's 2018 Efficiency Savings and Performance Incentive (ESPI) award has not been finalized as of this report's filing. 2018 draft ESPI numbers are provided per Draft Res.E-4979.



Appendix A

PG&E Program ID Numbers

Program ID	Program Name
PGE21001	Residential Energy Advisor
PGE210010	Pay for Performance Pilot
PGE210011	Residential Energy Fitness program
PGE21002	Plug Load and Appliances
PGE21003	Multifamily Energy Efficiency
PGE21004	Advanced Home Upgrade
PGE21005	Residential New Construction
PGE21006	Residential HVAC
PGE21007	California New Homes Multifamily
PGE21008	Enhance Time Delay Relay
PGE21009	Direct Install for Manufactured and Mobile Homes
PGE21011	Commercial Calculated Incentives
PGE210112	School Energy Efficiency
PGE210119	LED Accelerator
PGE21012	Commercial Deemed Incentives
PGE210123	Healthcare Energy Efficiency Program
PGE210135	Water Infrastructure and System Efficiency
PGE210139	SEI Energize Schools Program
PGE210143	Hospitality Program
PGE21015	Commercial HVAC
PGE21018	EnergySmart Grocer
PGE21021	Industrial Calculated Incentives
PGE210210	Industrial Retrocommissioning Program
PGE210211	Light Industrial Energy Efficiency
PGE210212	Compressed Air and Vacuum Optimization Program
PGE210213	Small Petrochemical Energy Efficiency
PGE21022	Industrial Deemed Incentives
PGE21023	Industrial Continuous Energy Improvement
PGE21024	Industrial Energy Advisor
PGE21025	California Wastewater Process Optimization
PGE21026	Energy Efficiency Services for Oil Production
PGE21027	Heavy Industry Energy Efficiency Program
PGE21028	Industrial Compressed Air Program
PGE21029	Refinery Energy Efficiency Program
PGE21030	Industrial Strategic Energy Management
PGE21031	Agricultural Calculated Incentives
PGE210311	Agriculture and Food Processing Wastewater Energy
PGE210312	Dairy and Winery Industry Efficiency Solutions
PGE21032	Agricultural Deemed Incentives
PGE21033	Agricultural Continuous Energy Improvement
PGE21034	Agricultural Energy Advisor
PGE21036	Industrial Refrigeration Performance Plus
PGE21039	Comprehensive Food Process Audit & Resource Efficiency



Program ID	Program Name
PGE21041	Primary Lighting
PGE21042	Lighting Innovation
PGE21043	Lighting Market Transformation
PGE21051	Building Codes Advocacy
PGE21052	Appliance Standards Advocacy
PGE21053	Compliance Improvement
PGE21054	Reach Codes
PGE21055	Planning and Coordination
PGE21056	Code Readiness
PGE21061	Technology Development Support
PGE21062	Technology Assessments
PGE21063	Technology Introduction Support
PGE21071	Centergies (WE&T)
PGE21072	Connections (WE&T)
PGE21073	Strategic Planning (WE&T)
PGE21081	Statewide DSM Coordination & Integration
PGE21091	On-Bill Financing (excludes Loan Pool)
PGE210911	On-Bill Financing Alternative Pathway
PGE21091LP	Financing Loan Pool Addition
PGE21092	Third-Party Financing
PGE2110011	California Community Colleges
PGE2110012	University of California/California State University
PGE2110013	State of California
PGE2110014	Department of Corrections and Rehabilitation
PGE2110051	Local Government Energy Action Resources (LGEAR)
PGE2110052	Strategic Energy Resources
PGE211007	Association of Monterey Bay Area Governments (AMBAG)
PGE211009	East Bay
PGE211010	Fresno
PGE211011	Kern
PGE211012	Madera
PGE211013	Marin County
PGE211014	Mendocino-Lake County
PGE211015	Napa County
PGE211016	Redwood Coast
PGE211018	San Luis Obispo County
PGE211019	San Mateo County
PGE211020	Santa Barbara
PGE211021	Sierra Nevada
PGE211022	Sonoma County
PGE211023	Silicon Valley
PGE211024	San Francisco
PGE211025	Savings by Design (SBD)
PGE211026	North Valley
PGE211027	Sutter Buttes
PGE211028	Yolo
PGE211029	Solano



Program ID	Program Name
PGE211030	Northern San Joaquin Valley
PGE211031	Valley Innovative Energy Watch (VIEW)
PGE_WATER	Water Energy Nexus

Appendix B

Regulatory Decisions, Rulings, and Advice Letters

EE Rulemaking Phase I

In 2014, the Commission completed Phase I of the *Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation and Related Issues* (R.13-11-005) that was issued on November 21, 2013. Phase I focused on approving EE funding and portfolios for 2015. PG&E filed its *Energy Efficiency 2015 Funding Proposal* on March 26, 2014. On October 24, 2014, the Commission issued approved D.14-10-046: *Decision Establishing Energy Efficiency Savings Goals and Approving 2015 Energy Efficiency Programs and Budgets*.

The Phase I Decision, as corrected by D.15-01-002 and D.15-01-023, approved PG&E's total 2015 EE portfolio budget of \$430.1 million, including \$379.3 million for PG&E's program budget, \$16.8 million for EM&V, \$12.8 million for BayREN's EE programs, and \$1.2 million for MCE's EE programs. The Phase I Decision also approved PG&E's request for \$3.3 million for 2015 DR funding for IDSM.

The Phase I Decision (pp. 30-32) determined that 2015 is the third year of a 2013-2015 portfolio cycle, allowing the IOUs and RENs to use unspent 2013-2014 funds in 2015, to count savings from 2013-2014 towards 2015 goals and cost effectiveness, and to calculate regulatory caps and targets. The Commission directed Staff to undertake EM&V activities for 2013-2014 and 2015 combined.

The Phase I Decision (OP 21 and pp. 31-32) leaves the 2015 programs and funding in place until the earlier of when the Commission provides superseding direction, or 2025.

The Phase I Decision (OP 16) required the IOUs and MCE to file Tier 2 advice letters within 60 days to reflect the budget adjustments adopted in the decision, including recalculated TRC and PAC test results exceeding a 1.0 threshold for 2015. PG&E filed this advice letter on December 15, 2014, with superseding supplemental advice letters in 2015, as detailed below. The Phase I Decision also required a number of other advice letters to be filed in 2015.

EE Rulemaking Phase IIa

On February 24, 2015, the Commission issued the Scoping Memorandum for Phase II of this proceeding. Based on prehearing conference statements from the parties involved, the Commission identified three broad categories of items to address in Phase II: (1) developing "Rolling Portfolio" review processes; (2) providing guidance on changes for 2016 portfolios; and (3) updating various portfolio metrics (e.g., DEER values) to keep portfolios on course through 2016 and beyond.

On October 28, 2015, the Commission issued D.15-10-028: *Decision Re Energy Efficiency Goals for 2016 and Beyond and Energy Efficiency Rolling Portfolio Mechanics*. (Phase IIa Decision). In this decision, the Commission adopted energy savings goals for EE portfolios from 2016-2024; established a "Rolling Portfolio" process for reviewing and revising portfolios; and updated various EE program portfolio metrics, including Database of Energy Efficient Resources values.

EE Rulemaking Phase IIb

On August 25, 2016, the Commission issued D.16-08-019: *Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings*. (Phase IIb Decision). In this Decision, the Commission set forth policy guidance on several issues related to the filing of EE business plans, as previously contemplated in D.15-10-028. The Decision also addressed next steps for regional energy networks, the appropriate baselines to be used to measure energy savings for specific programs and measures, transition for statewide and third-party programs, and changes to the evaluation and shareholder incentive frameworks.

The Commission issued a Scoping Memo on April 14, 2017 to evaluate the reasonableness of the IOU, REN, and CCA proposals for EE business plans, filed in January 2017. The Scoping Memo identified the scope of issues to be evaluated in the proceeding and established the schedule for 2017 activities, which included requests for supplemental information, revised metrics, and comprehensive solicitation plans. The Commission issued the Proposed Decision Addressing Third-party Solicitation Process for EE on November 13, 2017. The Proposed Decision was subsequently finalized as D.18-01-004 in January 2018, and established solicitation oversight mechanisms, directed the IOUs to develop standard contract terms, and set the schedule for transitioning to the third-party model.

On October 2, 2017, the Commission issued D. 17-09-025: *Decision Adopting Energy Efficiency Goals for 2018-2030*. In this Decision, the Commission adopted energy savings goals for EE portfolios from 2018-2030.

EE Rulemaking Phase III

On November 2, 2016, the Commission issued the Scoping Memorandum for Phase III of this proceeding. The Commission acknowledged that this proceeding was already well underway when SB350 (2015) and AB 802 (2015) both became law, creating a significant impact on the Commission's oversight of EE programs and policy. The key provisions of SB 350 for EE to include a goal of doubling the amount of EE savings in California by 2030, with emphasis on market transformation and pay-for-performance approaches, among other things. AB 802's provisions primarily affect the way baselines are set for measuring energy savings towards goals. This broad set of topics were covered, to some degree, in D.16-08-019. However, two specific areas warrant additional policy development in Phase III: (1) market transformation, as discussed in SB 350 and (2) custom projects, particularly in the industrial sector, as discussed in D.16-08-019.

This proceeding is still the ongoing venue for any policymaking related to EE. The ongoing policy issues identified including: updates to DEER and EE potential and goals; updates to the EE Strategic Plan; updates to the EM&V framework; the role of the California Technical Forum; updates to the ESPI mechanism; updates to the cost-effectiveness framework for EE, in coordination with the Integrated Distributed Energy Resource Rulemaking (R.) 14-10-003 and with the decarbonization rulemaking (R.19-11-011); coordination with statewide marketing, education, and outreach efforts; approached for evaluations using NMEC and/or dynamic baselines; and ISP determinations.

Business Plan Application

Application 17-01-013, et. al, established the process for reviewing, submitting, approving, and implementing program administration business plans for the rolling portfolio years 2018-2025.

On January 11, 2018, the Commission issued D.18-01-004: *Decision Addressing Third-Party Solicitation Process for Energy Efficiency Programs*, which formalized the third-party solicitation process for EE programs. In this Decision, the Commission set timelines for the EE portfolio's transition to predominantly third-party program implementation, with December 31, 2018 marking the first milestone with a minimum of 25 percent third-party program administration. 40 percent of programs should be third-party administered by the end of 2020, with the ultimate vision of reaching 60 percent third-party administration in the EE portfolio by the end of 2022.

On May 31, 2018, the Commission issued D. 18-05-041: *Decision Addressing Energy Efficiency Business Plans*. In this Decision, the Commission approved the 2018-2015 Business Plans, formalized the statewide program governance structure, and established the annual Joint Cooperation Memo (JCM) filings between program administrators with overlapping territories. This Application is ongoing for any policymaking related to solicitations and Business Plan updates and implementation.

Advice Letters

PG&E filed the following advice letters related to EE in 2018.

- 1) Proposed Modifications and Additions to the Pacific Gas and Electric Company On-Bill Financing Loan Program Rate Schedules and Related Program Forms, filed January 11, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3926-G.pdf
- 2) Request for Energy Efficiency Program Enhancements to Assist October 2017 Wildfire Impacted Customers, filed April 27, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3928-G.pdf
- 3) Request for Authority to Continue the Retail Products Platform Pilot within PG&E's Residential Energy Efficiency Plug-Load and Appliances Sub-Program, filed February 9, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3935-G.pdf
- 4) Supplemental: Request for Authority to Continue the Retail Products Platform Pilot within PG&E's Residential Energy Efficiency Plug-Load and Appliances Sub-Program, filed March 8, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3935-G-A.pdf
- 5) Second Supplemental: Request for Authority to Continue the Retail Products Platform Pilot within PG&E's Residential Energy Efficiency Plug-Load and Appliances Sub-Program, filed March 29, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3935-G-B.pdf
- 6) Supplemental: Request for Energy Efficiency Program Enhancements to Assist October 2017 Wildfire Impacted Customers, filed April 19, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3928-G-A.pdf
- 7) Southern California Edison Company, Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Gas Company's 2017 Energy Efficiency Incentive Award Earnings Rates and Award Caps, filed July 6, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3989-G.pdf



- 8) 2019 Joint Cooperation Memorandum (JCM) of SoCalGas, PG&E, SCE, and 3C-REN Pursuant to Decision (D.) 18-05-041, filed August 1, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4001-G.pdf
- 9) PG&E and BayREN's 2019 Joint Cooperation Memo in Compliance with Decision 18-05-041, Ordering Paragraph 38, filed August 1, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_3999-G.pdf
- 10) Marin Clean Energy's and Pacific Gas and Electric Company's Annual Joint Memorandum of Cooperation for Program Year 2019, filed August 1, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4000-G.pdf
- 11) Pacific Gas & Electric Company's Request to Establish the Statewide Energy Efficiency Balancing Account, filed September 4, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4010-G.pdf
- 12) PG&E's 2019 Energy Efficiency Annual Budget Advice Letter in Compliance with Decisions 15-10-028 and 18-05-041, filed September 4, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4011-G.pdf
- 13) San Diego Gas & Electric Company, Southern California Gas Company, Southern California Edison Company and Pacific Gas and Electric Company's Shared Funding Mechanism Proposal Pursuant to Decision 18-05-041, filed September 4, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4009-G.pdf
- 14) Supplemental: PG&E's 2019 Energy Efficiency Annual Budget Advice Letter in Compliance with Decisions 15-10-028 and 18-05-041, filed October 29, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4011-G-A.pdf
- 15) San Diego Gas & Electric Company, Southern California Gas Company, Southern California Edison Company and Pacific Gas and Electric Company's Shared Funding Mechanism Proposal Pursuant to Decision 18-05-041, filed November 15, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4009-G-A.pdf
- 16) Request of Pacific Gas and Electric Company for 2016 and 2017 Energy Efficiency Incentive Award, filed November 20, 2018.
https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4044-G.pdf

Appendix C

Third-Party Contract List

Program ID	Program Name	Primary Sector (Market Segment)	Sector (Sub-segment / Type of Customers)	Delivery Channel	Vendor	Length (Years)	Dollar Value
PGE210212	Compressed Air and Vacuum Optimization Program	Industrial	Industrial (Ind)	Downstream	ADVANCED AIR LEAK DETECTION	3.0	
PGE210213	Small Petrochemical Energy Efficiency	Industrial	Industrial (Ind)	Downstream	APTIM ENVIRONMENTAL & INFRASTRUCTURE	1.0	
PGE210311	Process Wastewater Treatment EM Pgm for Ag Food Processing	Agricultural	Agricultural (Ag)	Downstream	BASE ENERGY INC	3.0	
PGE210010	Pay for Performance Pilot	Residential	Residential (Res)	Downstream	BUILD IT GREEN	4.1	
PGE21034	Agricultural Energy Advisor	Agricultural	Agricultural (Ag)	Downstream	CALIFORNIA STATE UNIVERSITY	2.2	
PGE210112	School Energy Efficiency	Commercial	Commercial (Com)	Downstream	CLEARRESULT CONSULTING INC	4.0	
PGE21018	EnergySmart Grocer	Commercial	Commercial (Com)	Downstream	CLEARRESULT CONSULTING INC	2.7	
PGE21026	Energy Efficiency Services for Oil Production	Industrial	Industrial (Ind)	Downstream	CLEARRESULT CONSULTING INC	2.8	
PGE21030	Industrial Strategic Energy Management	Industrial	Industrial (Ind)	Downstream	CLEARRESULT CONSULTING INC	5.0	
PGE210312	Dairy and Winery Industry Efficiency Solutions	Agricultural	Agricultural (Ag)	Downstream	CLEARRESULT CONSULTING INC	4.5	
PGE21039	Comprehensive Food Process Audit & Resource Efficiency Pgm	Agricultural	Agricultural (Ag)	Downstream	CLEARRESULT CONSULTING INC	4.5	
PGE210143	Hospitality Program	Commercial	Commercial (Com)	Downstream	ECOLOGY ACTION OF SANTA CRUZ	2.4	



Program ID	Program Name	Primary Sector (Market Segment)	Sector (Sub-segment / Type of Customers)	Delivery Channel	Vendor	Length (Years)	Dollar Value
PGE211007	Association of Monterey Bay Area Governments (AMBAG)	Public	Commercial (Com)	Downstream	ECOLOGY ACTION OF SANTA CRUZ	2.8	
PGE211019	San Mateo County	Public	Commercial (Com)	Downstream	ECOLOGY ACTION OF SANTA CRUZ	2.4	
PGE211023	Silicon Valley	Public	Commercial (Com)	Downstream	ECOLOGY ACTION OF SANTA CRUZ	2.4	
PGE211014	Mendocino/Lake County	Public	Commercial (Com)	Downstream	ENERGY ALLIANCE ASSOCIATION	3.8	
PGE211015	Napa County	Public	Commercial (Com)	Downstream	ENERGY ALLIANCE ASSOCIATION	3.8	
PGE211022	Sonoma County	Public	Commercial (Com)	Downstream	ENERGY ALLIANCE ASSOCIATION	3.8	
PGE211029	Solano	Public	Residential (Res)	Downstream	ENERGY ALLIANCE ASSOCIATION	3.8	
PGE21009	Direct Install for Manufactured and Mobile Homes	Residential	Residential (Res)	Downstream	ENERGY EFFICIENCY INC	4.0	
PGE21001	Residential Energy Advisor	Residential	Residential (Res)	Downstream	ENERVEE CORPORATION	3.4	
PGE210010	Pay for Performance Pilot	Residential	Residential (Res)	Downstream	HIGH ENERGY ANALYTICS INC	6.5	
PGE21015	Commercial HVAC	Commercial	Commercial (Com)	Upstream/Midstream	HONEYWELL INTERNATIONAL INC	2.2	
PGE21002	Plug Load and Appliances	Residential	Residential (Res)	Midstream/Downstream	ICF RESOURCES LLC	3.0	
PGE210135	Water Infrastructure System Efficiency	Industrial	Industrial (Ind)	Downstream	LINCUS INC	4.5	
PGE21027	Heavy Industry Energy Efficiency Program	Industrial	Industrial (Ind)	Downstream	LOCKHEED MARTIN CORPORATION	5.0	



Program ID	Program Name	Primary Sector (Market Segment)	Sector (Sub-segment / Type of Customers)	Delivery Channel	Vendor	Length (Years)	Dollar Value
PGE210210	Industrial Recommissioning Program	Industrial	Industrial (Ind)	Downstream	NEXANT INC	2.8	
PGE210211	Light Industrial Energy Efficiency	Industrial	Industrial (Ind)	Downstream	NEXANT INC	5.1	
PGE21029	Refinery Energy Efficiency Program	Industrial	Industrial (Ind)	Downstream	NEXANT INC	2.5	
PGE21001	Residential Energy Advisor	Residential	Residential (Res)	Downstream	OPOWER INC	4.8	
PGE21008	Enhance Time Delay Relay	Residential	Residential (Res)	Downstream	PROCTOR ENGINEERING GRP LTD	4.0	
PGE21015	Commercial HVAC	Commercial	Commercial (Com)	Upstream/Midstream	PROCTOR ENGINEERING GRP LTD	4.0	
PGE21025	California Wastewater Process Optimization	Industrial	Industrial (Ind)	Downstream	QUANTUM ENERGY SERVICES AND INFO INC	3.1	
PGE210011	Residential Energy Fitness Program	Residential	Residential (Res)	Downstream	RICHARD HEATH & ASSOCIATES INC	3.8	
PGE211010	Fresno	Public	Commercial (Com)	Downstream	RICHARD HEATH & ASSOCIATES INC	2.8	
PGE211012	Madera	Public	Commercial (Com)	Downstream	RICHARD HEATH & ASSOCIATES INC	2.8	
PGE211026	North Valley	Public	Residential (Res)	Downstream	RICHARD HEATH & ASSOCIATES INC	2.8	
PGE211027	Sutter Buttes	Public	Residential (Res)	Downstream	RICHARD HEATH & ASSOCIATES INC	3.8	
PGE211028	Yolo	Public	Residential (Res)	Downstream	RICHARD HEATH & ASSOCIATES INC	2.8	
PGE211030	Northern San Joaquin Valley	Public	Residential (Res)	Downstream	RICHARD HEATH & ASSOCIATES INC	3.8	



Program ID	Program Name	Primary Sector (Market Segment)	Sector (Sub-segment / Type of Customers)	Delivery Channel	Vendor	Length (Years)	Dollar Value
PGE211011	Kern	Public	Commercial (Com)	Downstream	STAPLES & ASSOCIATES	3.2	
PGE211018	San Luis Obispo County	Public	Commercial (Com)	Downstream	STAPLES & ASSOCIATES	3.2	
PGE211020	Santa Barbara	Public	Commercial (Com)	Downstream	STAPLES & ASSOCIATES	3.2	
PGE211031	Valley Innovative Energy Watch (VIEW)	Public	Residential (Res)	Downstream	STAPLES & ASSOCIATES	3.2	
PGE210139	SEI Energize Schools	Commercial	Commercial (Com)	Downstream	STRATEGIC ENERGY INNOVATIONS	2.4	
PGE21003	Multifamily Energy Efficiency	Residential	Residential (Res)	Downstream	TRC SOLUTIONS INC	5.2	
PGE21005	Residential New Construction	Residential	Residential (Res)	Upstream	TRC SOLUTIONS INC	3.0	
PGE21007	California New Homes Multifamily	Residential	Residential (Res)	Midstream/Downstream	TRC SOLUTIONS INC	2.4	
PGE21036	Industrial Refrigeration Performance Plus	Cross-cutting	Agricultural (Ag)	Downstream	VCCT INC	3.0	
PGE210123	Healthcare Energy Efficiency Program	Commercial	Commercial (Com)	Downstream	WILLDAN ENERGY SOLUTIONS	2.8	
					Grand Total:		\$404,215,294

- (1) This table only covers programs, not services (consistent with Table T-3 which only lists third-party programs).
- (2) A non-redacted and redacted version have been produced. The redacted information is the individual values of the contracts. The Total Portfolio contract value is public.
- (3) Primary sector and sector classifications are from CEDARS.
- (4) Delivery channels are consistent with the Joint AL for ESPI Coefficients and CEDARS.
- (5) Length of contract is the timeframe between contract effective date through the contract termination date.
- (6) PG&E was unable to confirm the data required for the newly-required "size" field.
- (7) Contract duration includes 2018 and beyond. Contracts concluded prior to 2018 are excluded. Contracts with "end dates" in 2018 and beyond are included.
- (8) Vendors and subprograms in this list should qualify under the old 20 percent third-party definition, which includes both 3P implementers and any CORE/GP competitively-bid implementer contracts.