Pacific Gas and Electric Company®

2021 ENERGY EFFICIENCY ANNUAL REPORT

JUNE 1, 2022

TABLE OF CONTENTS

Executive Summary

Serving residential, commercial, industrial, agricultural, public, and other customers across the state, Pacific Gas and Electric Company (PG&E) has worked for more than four decades to enable our customers to reduce their energy use and carbon footprint. Today, our energy efficiency programs (EE) empower customers to eliminate unnecessary energy use, reduce energy demand on the grid, keep customer energy bills affordable, and contribute to California's clean energy goals. In 2021, PG&E continued its role as a leader in EE, delivering a dynamic portfolio of programs structured to meet customers' evolving needs.

In 2021, PG&E worked through programs and partnerships to drive energy savings and help position the state to meet its EE and carbon reduction goals. PG&E works to meet California's energy goals and serves the diverse needs of more than 16 million customers across a 70,000 square-mile service territory. PG&E's EE portfolio is designed to reach customers across all sectors using a variety of channels, from self-service software tools to PG&E's business customer account representatives. PG&E also partners with state and local governments, as well as community partners and trade professionals, and offers education and training to building professionals.

This report is being filed in compliance with Commission guidance on Energy Efficiency program reporting[1], which was expanded following approval of the Energy Efficiency Business Plans in Decision (D.)18-05-041 and updated in D.21-05-031.[2] This report focuses on program activities and accomplishments in the year 2021 and describes the full set of programs in PG&E's 2021 portfolio.

Continuing to Support Customers Coping with COVID-19-related Challenges

In 2021, PG&E continued to support customers by offering enhanced rebates for smart thermostats for residential customers and ultra-low temperature freezers used for vaccine storage. PG&E also expanded eligibility for contactless energy efficiency programs and allowed small businesses to defer payment of on-bill energy efficiency financing loans. PG&E also launched a new and improved Bill Forecast Alert notification program, to help customers spending more time at home gain more control over their bills and reduce energy use. To ensure that customers benefited from these notifications, PG&E proactively enrolled 1.6 million customers into the program in 2021.

Launching New Statewide Programs

PG&E launched several statewide programs for which it serves as the lead IOU in 2021, in the new construction, institutional partnerships, and workforce education and training sectors. PG&E launched residential and nonresidential new construction programs that support both all-electric and efficient, electric-ready mixed fuel projects. PG&E also launched its Statewide Career and Workforce Readiness and Career Connections programs, as well as the Statewide

[1] Pursuant to Attachment C of ALJ Ruling Adopting Annual Reporting Requirements for Energy Efficiency and Addressing Related Reporting Issues, dated August 8, 2007.

[2] Joint Cooperation Memoranda with Bay Area Regional Energy Network (BayREN), Marin Clean Energy (MCE), and Tri-County Regional Energy Network (3C-REN) were attached to those Program Administrators' 2021 Annual Reports.

State of California institutional partnerships program. By leading these programs, PG&E will support efficient buildings, the EE workforce, and California's climate goals across the state.

Continuing Progress Toward Third-Party Outsourcing Targets

In 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. PG&E met its first two milestones in 2020, achieving a target of outsourcing 25 percent of its portfolio by June 30, 2020 and a target of outsourcing 40 percent of its portfolio by December 31, 2020.[3] These achievements were the result of a comprehensive third party solicitations effort. In 2021, PG&E continued to progress toward the final milestone of a 60 percent outsourced portfolio by December 2022. PG&E obtained approval of and launched 11 new third-party programs to serve residential and nonresidential customers and offer workforce training, including multiple PG&E-led statewide programs.

Supporting California's Ambitious Climate and Energy Goals Through Advocacy, Code Compliance, and Training

PG&E's codes and standards advocacy and compliance improvement activities extend to virtually all buildings and appliances sold in California. These activities include supporting local government policies that promote all-electric new construction. Since July 2019, PG&E has provided letters of support for all-electric new construction codes or ordinances to dozens of cities and counties, and continued this work in 2021. PG&E also advocated in 2021 for stronger, cost-effective building codes and appliance standards, provided the industry with tools to help simplify their energy code tasks while verifying compliance, and delivered training to more than 2,800 building and compliance industry representatives.

Offering No-Interest Energy Efficiency Financing

PG&E's on-bill financing program provides commercial customers and government agencies with loans for energy efficiency upgrades with no out-of-pocket costs and zero interest. In 2021, the program funded 551 loans worth a total of $69 million. Most loans went to small and medium businesses, as well as public organizations.

Helping Industrial Customers Reduce Their Energy Usage Through Strategic Energy Management Programs

Strategic Energy Management (SEM) programs take a holistic approach to efficiency. SEM can include retro-commissioning and upgrading equipment, working with industrial facility employees to pursue energy savings, and providing planning resources for future energy needs. In 2021, PG&E's multi-year Strategic Energy Management programs continued with 45 customers participating. These programs are expected to yield significant savings by implementing energy management practices at their facilities and changing the way operations teams think about energy use.

Offering Education and Training

[3] D.18-05-041 extended the 25% third-party portfolio implementation deadline to Dec 19, 2019, and the CPUC approved a joint IOU request to extend to June 30, 2020 in November 2019.

Bolstering the workforce is one of PG&E's key approaches to support the long-term success of the EE market. PG&E offers education and training to architects and other building professionals; in 2021, PG&E did so by leveraging remote technology. In 2021, PG&E's Workforce Education and Training programs trained approximately 23,000 participants and delivered more than 500 classes and webinars while also offering over 100 on-demand classes.

Planning For the Future

In 2021, the Commission issued D.21-05-031, which outlined an ambitious new future for EE in California, including total system benefit goals, portfolio segmentation, and a new portfolio planning cycle. PG&E began to plan for that future in 2021. Its 2022-2023 Biennial Budget Advice Letter that will help PG&E orient toward the new EE paradigm over the next two years. In addition, PG&E began work on its 2024-2031 business plan application, filed in February 2022. In the coming years, PG&E will continue to deliver on its commitment to customers and support California's EE and climate goals through innovative program and pilot strategies and excellence in program administration.

Annual Report Data

D.19-08-034 established net energy savings and demand reduction goals for 2021 for investor-owned utility (IOU) territories, for both incentive and codes and standards programs. Achievements discussed in this section comprise total impacts, across both incentive and codes and standards programs combined. In 2021, PG&E achieved savings of 1,846 GWh; 316 MW of peak demand reduction; and 43 million therms.[4] 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 greenhouse gas (GHG) emissions, with avoided annual emissions of more than 700,000 tons[5] of carbon dioxide. Please see Section 6 for more specifics on PG&E's portfolio cost-effectiveness.

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 EM&V budget allocation[6] and the 20 percent direct implementation non-incentive (DINI) target. Statewide ME&O is excluded from the marketing cap.[7] 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)[8] along with PG&E's monthly expenditure and savings reports.

[4] Energy savings include savings from Regional Energy Network (REN) and Community Choice Aggregator (CCA) programs in PG&E's service area, which represented approximately 1% or less of total annual savings.

[5] The figure reported above is in net annual ("short" or US) tons of CO_2 avoided, using the unit provided by the CPUC's Cost Effectiveness Tool (CET). GHG emissions are commonly reported in metric tons; PG&E's CO_2 impacts are equal to 635,000 metric tons.

[6] Affirmed in D.16-08-019, Conclusion of Law 67.

[7] D.13-12-038, p. 82.

[8] See Cap and Target reports at https://cedars.sound-data.com/documents/standalone/list/.

Program Descriptions and Strategies

In 2021, the PG&E administered a broad portfolio of EE programs that served a diverse array of market sectors and customer types and supported efficiency across numerous technologies. 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 PG&E's 2018-2025 Energy Efficiency Business Plan goals to provide customers with a more integrated EE experience, access to information, and greater financing opportunities.

PG&E serves approximately 70,000 square miles in Northern and Central California and serves approximately 16 million customers. 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 meet customers' needs, PG&E offers programs that serve broad market segments and leverages local partnerships and third-party programs to serve targeted markets, harder-to-reach segments, and groups with specific needs.

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.

This section describes PG&E's successful strategies and accomplishments for the following program sectors in 2021:

1. Statewide
2. Residential
3. Commercial
4. Public
5. Industrial
6. Agricultural
7. Financing
8. Emerging Technologies
9. Codes, Standards, and New Construction
10. Workforce Education and Training

Statewide Program Implementation

Starting in 2016, the California Public Utilities Commission (CPUC or Commission) directed the California Investor Owned Utilities (IOUs) to begin transitioning California toward greater statewide program administration and third-party involvement in the proposal, design, implementation, and delivery of energy efficiency programs.[9] IOUs are required to allocate at least 25% of their proposed Business Plan budgets to statewide programs[10] and at least 60% to third-party programs by the end of 2022.[11]

The Commission established statewide programs and the associated lead IOU[12] in 2018, as described here:

Table 1. Lead Program Administrator for Statewide Programs by Area

Program Category	Lead IOU
Plug Load and Appliance	SDG&E
HVAC (Upstream Residential, Upstream Commercial)	SDG&E
New Construction (Residential)	PG&E
New Construction (Non-Residential)	PG&E
Codes & Standards (Building Codes Advocacy)	PG&E
Codes & Standards (Appliance Standards Advocacy)	PG&E
Codes & Standards (National Advocacy)	PG&E
Lighting	SCE
Emerging Technologies (Gas)	SoCalGas
Emerging Technologies (Electric)	SCE
Workforce Education & Training (Career Connections)	PG&E
Institutional Partnerships (University of California, California State University), called “Higher Education”	SCE
Institutional Partnerships (State of California, California Department of Corrections)	PG&E
Foodservice Point of Sale	SoCalGas
Midstream Commercial Water Heating	SoCalGas

[9] D.16-08-019, Decision providing guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings.
[10] D.16-08-019, OP 6.
[11] D.18-01-004, OP 1.
[12] D.18-10-041, OP 26.

Table 2. Lead Program Administrator for Statewide Downstream Pilot Programs

Program	Lead IOU
HVAC Quality Installation/Quality Maintenance (QI/QM)	SDG&E
Water/Wastewater Pumping Program	SCE
Workforce Education & Training (Career and Workforce Readiness)	PG&E

The Commission also outlined the roles and responsibilities for statewide program leads[13], noting that they would each have sole responsibility for the following:

a. Program vision development, design/delivery, and intervention strategies;
b. Procurement, contract administration, and co-funding management from partner program administrators;
c. Implementer oversight;
d. Implementer management, rewards, and any necessary corrective action;
e. Review of implementer performance and program performance on a quarterly basis;
f. Meeting savings goals and customer satisfaction levels;
g. Metrics development; and
h. Reporting.

The IOUs intended to outsource the proposal, design, implementation, and delivery of statewide programs to third parties as part of their third-party solicitations, associated with the implementation of 2018 – 2025 EE Business Plans. Therefore, the budgets for statewide programs will count towards both the 25% statewide and 60% third-party outsourcing requirements. Statewide programs are designed and delivered by one or more statewide implementers, under contract to the Lead IOU.[14]

Program administrators collaborate to keep each other informed on statewide program progress, enabling coordination on program delivery and timely updates on statewide program budgets. Statewide coordination is intended to keep all program administrators informed of each individual IOU's required allocations toward statewide programs for use in portfolio planning, as well as regulatory budget filings. This statewide coordination aligns with Commission guidance, which confirms that "statewide activities are clearly in support of state policy and actively supervised by, and a priority for the Commission"[15] and helps to avoid a conflict with the scope of a statewide program as described in D.18-05-041.[16] Additional compliance reporting on statewide program administration is detailed in Section 11 of this report.

[13] D.18-05-041, p. 185-186, OP 18.
[14] D.16-08-019, p. 109, OP 5.
[15] D.18-05-041, p. 81.
[16] D.18-05-041, p, 173, COL 17 which states, "All PAs should have the ability to continue local pilot activities that would otherwise qualify for statewide administration but that are not yet ready for such statewide treatment, provided that such local pilots or programs do not compete with, or otherwise impede the progress or activities of, operational statewide programs."

Statewide Energy Efficiency Programs

Below, PG&E provides a status update on the statewide programs listed above.[17] A summary narrative has been provided for PG&E-led statewide programs that have either already launched or have reached the stage of seeking Commission approval of contracts through the Advice Letter process. PG&E provides funding to the lead program administrator for each program as shown in Tables 3 and 4 of D.18-05-041. PG&E receives credit for the proportional benefits from statewide programs through the CPUC's California Energy Data Reporting System (CEDARS). Please refer to the lead program administrators' respective 2021 Annual Reports for information on statewide programs.[18] Descriptions of PG&E-led statewide programs follow.

State Building Codes Advocacy Program: Title 24, Part 6 & Part 11 (PGE_SW_CSA_Bldg)

Lead IOU: PG&E

The Statewide Building Codes Advocacy program supports the California Energy Commission's triennial update to the Energy Code (Title 24, Part 6) to include new EE regulations or to strengthen existing regulations for various technologies or measures. Advocacy activities include the development of Codes and Standards Enhancement (CASE) proposals, research to provide the data needed to advance EE regulations, and participation in public rulemaking processes. The program also supports the Energy Commission in preparing recommendations to the Building Standards Commission to update the California Green Buildings Standards (Title 24, Part 11 or CALGreen). The voluntary energy measures in CALGreen provide foundational elements for local reach codes. To learn more about Statewide Building Code Advocacy activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

State Appliance Standards Advocacy Program (PGE_SW_CSA_Appl)

Lead IOU: PG&E

The State Appliance Standards Advocacy (ASA) program targets improvements to Title 20 through advocacy at the California Energy Commission. Advocacy activities include developing Title 20 code enhancement proposals and participating in the California Energy Commission public rulemaking process. Additionally, the program monitors state and federal legislation. To learn more about State ASA activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

National Codes and Standards Advocacy Program (PGE_SW_CSA_Natl)

Lead IOU: PG&E

National Codes & Standards: DOE, ASHRAE 90.1 and 189.1, IECC, ENERGY STAR

PG&E advocates for national building codes and appliance standards that support California by encouraging adoption of transformative technologies and construction processes. Alignment between national and state codes 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 DOE, Environmental Protection Agency (EPA), Federal Trade Commission (FTC), ASHRAE and IECC code and standard update proceedings in support of increasing requirements is important to minimize gaps, when regionally appropriate, between the California's EE regulations and the EE regulations that other states adopt. To learn

[17] Solicitations status is based on the Joint IOU Energy Efficiency Solicitation Schedule, available at https://www.caeecc.org/third-party-solicitation-process

[18] Available on the "Documents" section of CEDARS: https://cedars.sound-data.com/documents/standalone/list/

more about Statewide National Codes and Standards Advocacy activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

California Energy-Smart Homes All Electric Residential Program (PGE_SW_NC_Res_electric)

Statewide Program Lead: PG&E
Implementer: TRC

The California Energy-Smart Homes All-Electric Residential Program (CESH-AE) supports a high-level approach to achieving California's advanced energy efficiency policy goals through 2025 by engaging with builders and developers to recruit projects and influence them to build all-electric. The program is available to customers in the PG&E, SCE, and SDG&E territories. The all-electric program offering serves five residential sub-sectors: Single family and duplexes, multifamily low-rise (three or fewer stories), manufactured housing, accessory dwelling unit (ADUs,) and addition/alteration (A&A, additions greater than 700 square feet). The program influences the decision and ease the transition to adopt all-electric new construction practices by educating potential participants and stakeholders on the features of all-electric homes, enrolling projects, emphasizing the installation of advanced EE measures, and facilitating future opportunities through non-incentivized, prerequisite measures that position homes to install high-impact demand response technologies more easily in the future. To learn more about CESH-AE activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

California Energy-Smart Homes Mixed-Fuel Residential Program (PGE_SW_NC_Res_mixed)

Statewide Program Lead: PG&E
Implementer: TRC

The California Energy-Smart Homes Mixed-Fuel Residential Program (CESH-MF) supports a high-level approach to achieving California's advanced energy efficiency policy goals through 2025 by engaging with builders and developers and recruiting projects in the project development phase of either new construction projects that are unable to make the switch to all-electric or alteration projects that are only able to partially convert to all-electric and influencing them to adopt advanced energy measures. The program is available to customers in the PG&E, SCE, SoCalGas, and SDG&E territories. The mixed-fuel program offering serves three residential subsectors: Single family and duplex, multifamily low-rise (three or fewer stories), and alterations.

The program influences the decision and eases the transition to adopt advanced energy measures and facilitates future opportunities through non-incentivized, pre-requisite measures that position homes to transition to all-electric and install demand response technologies more easily in the future. To accomplish this, the program educates potential participants and stakeholders on the features of mixed-fuel and electric-ready homes, enrolls projects, emphasizes the installation of advanced energy efficiency measures, and facilitates future opportunities through non-incentivized, prerequisite measures that position homes to install electric equipment and appliances, as well as high-impact demand response technologies more easily in the future.

To learn more about CESH-MF activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

California Energy Design Assistance All-Electric (CEDAE) Program (PGE_SW_NC_NonRes_Com_electric)

Statewide Program Lead: PG&E

Implementer: Willdan Energy Solutions

The CEDAE program serves commercial, public, high-rise multifamily residential, industrial, and agricultural new construction sectors, and major alterations in facilities across the PG&E, SCE, and SDG&E territories. This program contributes to the IOUs' efforts to achieve their share of California's ambitious EE, greenhouse gas emission reduction, and Zero Net Energy (ZNE) goals by offering EE options tailored to each building during the design and construction process. CEDAE also offers technical assistance early in the process, when it has the greatest influence on design and operation, driving energy savings beyond code and gathering data to further advance future codes. The CEDAE program both directly supports projects and influences the non-residential new construction market to achieve deeper energy savings and decarbonize through key activities such as outreach and education, energy modeling, verification, and data tracking to inform future codes and standards. To learn more about CEDAE activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

California Energy Design Assistance Mixed Fuel (CEDAM) Program (PGE_SW_NC_NonRes_Com_mixed)

Statewide Program Lead: PG&E

Implementer: Willdan Energy Solutions

The CEDAM program serves commercial, public, high-rise multifamily, industrial, agricultural, new construction sectors, and major alterations in facilities across the PG&E, SCE, SoCalGas, and SDG&E territories. CEDAM contributes to the IOUs' efforts to achieve their share of California's ambitious EE, greenhouse gas emission reduction, and ZNE goals by offering technical assistance early in the process, when it has the greatest influence on design and operation, driving energy savings beyond code and gathering data to further advance future codes. The CEDAM program will both directly support projects and influence the non-residential new construction market to achieve deeper energy savings and decarbonization through outreach and education, energy modeling, verification, and data tracking to inform future codes and standards. To learn more about CEDAM activities in 2021, please see the Codes, Standards, and New Construction chapter of this report.

State of California Energy Strategy and Support Program (PGE_SW_IP_Gov)

Statewide Program Lead: PG&E

Implementer: AESC

The State of California Energy Strategy and Support Program (SOC ESS) opened to customers in September 2021. SOC ESS helps California State Agencies (excluding higher education, which will be served by a Statewide program led by SCE) reach their greenhouse gas (GHG) emission reductions goals while reducing energy use through EE and Integrated Demand-side Management (IDSM) project planning, technical support, and financial assistance. The program builds on the State's successful existing approaches while adding new channels to address key barriers California state agencies. SOC ESS is designed to overcome structural and operational barriers related to staffing and capacity, capital and financing, and safety to support successful realization of energy savings in state buildings.

The Program offers two pathways with varying levels of support. Pathway 1 provides agencies that are committed to a minimum level of energy savings and program engagement with high-touch, customized, and strategic portfolio-wide and engineering support plus staff augmentation. Pathway 2 provides support on individual projects as identified and pursued.

Additionally, the Program continues to provide all agencies with the services they relied on through the prior statewide partnership programs, including financial, policy, technical, project, and program application support. To learn more about SOC ESS activities in 2021, please see the Public Programs chapter of this report.

Career Connections: Energy is Everything (PGE_SW_WET_CC)

Statewide Program Lead: PG&E

Implementer: The Energy Coalition (TEC)

The Statewide Career Connections third-party "Energy is Everything" (EisE) program helps to build the next generation of energy workers. EisE provides Kindergarten through 12th grade students the knowledge, skills, and abilities they need for college and career opportunities in the energy industry and motivates students to adopt pro-environmental behaviors. EisE incorporates career concepts for all learners, since early exposure to career options increases the chances of students pursuing and securing high-demand energy and STEM careers. Education providers targeted will primarily focus on those classified as "disadvantaged". To learn more about EisE activities in 2021, please see the Workforce Education & Training chapter of this report.

Career and Workforce Readiness: Energize Careers (PGE_SW_WET_Work)

Statewide Program Lead: PG&E

Implementer: Strategic Energy Innovations (SEI)

Energize Careers aims to create a diverse and representative energy workforce through the economic empowerment of people who experience personal or systemic barriers to employment. Energize Careers assists program participants in accessing technical training and living wage energy career opportunities. Energize Careers provides holistic services to support disadvantaged workers through technical training and job placement, as well as wrap-around service support. Energize Careers collaborates with pre-apprenticeship programs, apprenticeship programs, community-based training organizations, and community colleges to provide technical energy job training to disadvantaged workers. Energize Careers also collaborates with wrap-around service providers and industry partners to provide people with services and support to access career pathways into jobs where they can leverage their energy efficiency knowledge and skills. To learn more about Energize Careers activities in 2021, please see the Workforce Education & Training chapter of this report.

Table 3. Status of Upcoming Statewide Programs[19]

Program Category	Lead IOU	Status
Plug Load and Appliance	SDG&E	Contract Negotiations
Emerging Technology (Electric)	SCE	Launched in April 2022
Institutional Partnerships (Higher Education)	SCE	RFP Scheduled to Launch June 2022

[19] Solicitations status is based on the Joint IOU Energy Efficiency Solicitation Schedule, available at https://www.caeecc.org/third-party-solicitation-process.

Table 4. Status of Upcoming Statewide Pilots[20]

Program	Lead IOU	Status
HVAC Quality Installation/Quality Maintenance (QI/QM)	SDG&E	RFP Scheduled to Launch Q1 2023
Water/Wastewater Pumping Program	SCE	RFP Scheduled to Launch Q3/Q4 2022

[20] Solicitations status is based on the Joint IOU Energy Efficiency Solicitation Schedule, available at https://www.caeecc.org/third-party-solicitation-process.

Residential Programs

PG&E's vision for the residential sector is to deliver a diverse portfolio that will achieve energy savings and grid benefits through (1) focused customer engagement and (2) data-driven programs that leverage market actors.

PG&E's residential programs offer a suite of incentives, services, and tools aimed at helping customers save energy and money, while meeting portfolio goals.

PG&E's Key Residential Program Goals

- Deliver residential EE programs that are leveraged as a grid resource
- Make EE accessible through diverse residential program offerings
- Increase access to and use of energy usage data
- Support state policy objectives around residential homes, including new construction
- Support customers with Energy Efficiency offerings during the COVID-19 pandemic

In 2021, programs engaged customers and other market actors through the following channels:

- Improvements to the built environment, such as whole home upgrades, Heating, Ventilation and Air Conditioning (HVAC), water heating, and new construction
- Education and tools to help customers to make informed decisions on more energy efficient products and appliances
- Behavioral and home energy management tips, tools and initiatives

PG&E continued to safely serve residential customers through the ever-changing COVID-19 pandemic environment of 2021. PG&E's residential programs prioritized customer safety during the ongoing COVID-19 pandemic and offered both virtual and in-person support in accordance with federal, state, and county safety guidelines.

Key Initiatives

Supporting Customers During the Pandemic

In addition to taking safety precautions with energy efficiency (EE) programs, PG&E supported customers during the COVID-19 pandemic by expanding the reach of behavioral programs. PG&E continued regular communications to drive customers' awareness and understanding of the resources available to help them. These communications highlighted EE programs, energy saving tips, energy management tools, customer protections, income qualified programs, and alternative payment arrangement options.

Portfolio Outsourcing

PG&E continued solicitations and negotiations for the residential sector, ramping down and sunsetting programs not designed and implemented by third parties. Successful solicitations saw the contracting of the new Continuous Energy Feedback Program (CEFP) and the launch of the new Multifamily Energy Savings Program (MESP). In 2021, PG&E also successfully completed and launched two statewide residential new construction programs, led by PG&E, which replaced the residential new construction program described below. Details on the new Statewide Residential New Construction programs can be found in the Codes, Standards, and New Construction chapter of this report. 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.

Residential Meter-Based Offerings

PG&E continued its residential Normalized Metered Energy Consumption (NMEC) programs, the residential Pay for Performance (P4P) programs. The P4P programs all employ metered energy consumption data for customer targeting to deepen energy savings and help the program drive grid benefits. These programs aim to achieve PG&E's goals of establishing savings persistence and on-going relationships between PG&E, the third-party program implementers, and our customers. PG&E had three active Pay for Performance Programs: Comfortable Home Rebates, Virtual Energy Audit Program, and Home Energy Rewards. Home Energy Rewards and Home Energy Optimization both began sunsetting in 2021 due to lack of claimable savings.

Behavior-based Savings Expansion Through Home Energy Reports

PG&E expanded the Home Energy Reports (HERs) program from 1.8 million customers to a total of 2.9 million customers in 2021. PG&E also continued new report enhancements including an Electric Vehicle owner HERs report and new design that helped contribute to savings and a better customer experience.

Opportunities Moving Forward

Opportunities in 2022 will focus on implementation success of the multifamily program, expanding the behavioral program to include Time-of-Use (TOU) Coach reports and Video Home Energy Reports (HERs), enhancing the Marketplace (described below) with the goal of simplifying how customers find solutions to energy-related problems through products and programs, and launching an equity-

focused residential program RFP in alignment with the CPUC's EE segmentation framework. PG&E will continue to look for opportunities to expand IDSM and electrification support for its residential customers.

Residential Programs

Residential Energy Efficiency Program (PGE21002)

The Residential Energy Efficiency Program (REEP), previously known as Plug Load and Appliances (PLA), aims to transform the market to achieve sustainable adoption of energy-efficient products so that ongoing intervention would no longer be required. Through REEP, PG&E offers rebates to customers who purchase and install qualifying smart thermostats and electric heat pump water heaters (HPWH). For the short- to mid-term timeframe, where REEP products are still not the market's default choices, PG&E uses incentives to increase availability, awareness, and adoption of energy-efficient products. This program, layered with California's Technology and Equipment for Clean Heating (TECH) initiative, creates a generous incentive that will attract both customers and contractors to invest in the newer HPWH technology. The program'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.

2021 Strategies and Successes

Throughout 2021, PG&E offered rebates to residential end-use customers to cover a portion of the incremental costs of purchasing energy-efficient smart thermostats and electric heat pump water heaters. PG&E continued its enhanced smart thermostat rebate of up to $120 for qualified models when customers agreed to sign up for the TOU rate plan (or were already on the plan). The purchase of a smart thermostat, combined with a TOU rate plan, aims to reduce energy costs for customers by shifting heating or cooling needs to times when energy demand and rates are lower, and the amount of renewable energy is higher. PG&E continued its $50 rebate for qualified smart thermostats if customers did not choose to move to a TOU rate.

In 2021, PG&E rebated 26,299 smart thermostat applications, up from 15,179 rebates in 2020. The enhanced rebate represents a significant IDSM initiative that PG&E has made in the past few years and increases PG&E's compliance with AB 793 mandates. 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 Statewide Plug Load and Appliance (PLA) program, led by SDG&E, is expected to launch in 2022. PG&E's REEP program is expected to ramp down after the launch of the Statewide PLA program.

Residential New Construction Program (PGE21005)

Implementer: TRC

The Residential New Construction program consists of the California Advanced Homes Program (CAHP) for single family homes, and PG&E's California New Homes Multifamily third-

party program. The CAHP and California New Homes Multifamily program (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.

2021 Strategies and Successes

The Residential New Construction programs updated their program structures and designs to better guide participants towards the 2019 Title 24 updates, moving to use of the energy design rating (EDR) to determine eligibility and base incentive level. The program also placed an emphasis on advanced building envelope measures by offering cash bonuses for specific measures. These high-performance envelopes support the resiliency of the home energy savings for the life of the building.

In 2021, the solicitation for the Statewide Residential New Construction program was completed, with the launch of the California Energy-Smart Homes Mixed-Fuel Residential Program and the California Energy-Smart Homes All Electric Residential Program in Q3 2021. Customers previously served by PG&E's CAHP will now be served by the California Energy-Smart Homes programs. More details on these new Statewide Programs can be found in the Codes, Standards, and New Construction chapter of this report.

As part of PG&E's commitment to meet the challenges of extreme weather resulting from climate change, PG&E continued offering increased new construction energy efficiency incentives for customers who lost their homes in Northern California wildfires. These program incentives, known as the Advanced Energy Rebuild (AER) are an enhancement to the existing CAHP and are intended to help homes that were red-tagged by CAL FIRE. AER was closed to new applications at the end of 2020 in anticipation of the launch of the Statewide Wildfire and Natural Disaster Resiliency Rebuild (WNDRR) program but will continue to complete projects through the end of 2022.

California Multifamily New Homes Program (PGE21007)

Implementer: TRC

The California Multifamily New Homes (CMFNH) program provides comprehensive support for saving energy in the residential new construction sector with a cross-cutting focus on sustainable design and construction, green building practices, EE, and emerging technologies. Through a combination of education, design assistance, and financial support, the California New Homes Multifamily program encourages building and related industries to exceed California's Title 24 standards and prepares builders for future changes to these standards.

2021 Strategies and Successes

In 2021, PG&E continued to work on completing a robust pipeline of long-term projects that had been recruited and enrolled into the CMFNH program in 2019. The CMFNH program will be ramping down and is expected to close in November 2022. Going forward, the multifamily sector will be served by the Statewide Non-Residential New Construction programs—the California Energy Design Assistance All-Electric (CEDAE) Program, and the California Energy Design Assistance Mixed Fuel (CEDAM) Program—led by PG&E. Additional details on the new Statewide Non-Residential New Construction programs can be found in the Codes, Standards, and New Construction chapter of this report.

Residential Pay for Performance (P4P) Program

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

PG&E began offering the Residential Pay for Performance (P4P) Pilot program 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.

In 2021, the ResP4P program included three active programs and one paused program, covering PG&E's service territory and offering variations of services focused on behavioral, operational and deep retrofit measures. Having multiple programs helps customers and energy efficiency professionals successfully implement deeper retrofit projects by capturing multiple cost-effective energy savings opportunities throughout the customers' EE journey. The programs are:

1. **Comfortable Home Rebates, offered by Franklin Energy (PGE_Res_001a)**: Deep retrofit home maintenance and upgrade program focused on air conditioning efficiency and other home comfort upgrades including new heating and cooling equipment, insulation, new ducts, weather stripping and air sealing.

2. **HomeIntel, offered by Home Energy Analytics (PGE_Res_001b)**: In-depth analysis of a home's energy use, customized recommendations and energy coaches to help reduce energy usage. Includes monthly energy efficiency progress report.

3. **Home Energy Rewards, offered by Franklin Energy (PGE_Res_001c)**: In-depth analysis of a home's energy use, customized recommendations, and free energy savings kit (LEDs, water saving devices), and discounted energy efficient products. Home Energy Rewards will complete ramp down in 2021 due to lack of realized savings behind the meter.

Home Energy Optimization, offered by ICF (PGE_Res_001d), was paused by the implementer in 2020 due to challenges from the COVID-19 pandemic, and was closed in December 2021 due to lack of realized savings behind the meter. Due to similar challenges, Comfortable Home Rebates (PGE_Res_001a) is also expected to close in December 2022.

2021 Strategies and Successes

The P4P programs enrolled more than 12,100 residential meters in 2021. This was an increase from the previous year, which saw about 9,200 enrollments. The programs are conducted with the expectation that implementers evolve intervention strategies to provide savings at scale and that valuable data and lessons learned will be collected and incorporated in any future scaled deployment of P4P models. In 2021, PG&E worked with a third-party vendor to refine savings calculation methods to use comparison groups to help account for changes in energy usage related to COVID-19. This updated savings calculation approach will continue to be used in the future.

Residential Energy Advisor: Home Energy Checkup (PGE_Res_002a)

Implementer: Oracle

The Residential Energy Advisor program uses behavioral outreach initiatives and interactive tools, including HERs, 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 HEC subprogram is a self-guided online assessment that helps customers understand where they use energy in their homes. It also provides energy-saving tips and suggestions based on the customer's specific responses and generates a simple checklist plan. The plan is saved on the customer's PG&E My Account website to track progress as they complete the items.

2021 Strategies and Successes

In 2021, PG&E continued to actively promote HEC to PG&E customers by implementing email campaigns, targeted web banners, and unauthenticated experiences to reduce friction in the completion process. In 2021, more than 240,000 Home Energy Checkups were completed, representing a 27% increase from 2020 completions.

Residential Energy Advisor: Marketplace (PGE_Res_002b)

PG&E's Marketplace is a tool that helps customers choose efficient products and find eligible rebates. Marketplace presents an Energy Score and other energy related features, such as total cost and lifetime energy costs to add a product's energy efficiency into a buyer's decision-making process. PG&E reports separately on Marketplace program metrics, which are detailed in Section 12 of this report. The HER component of the Residential Energy Advisor program is described in detail in the Residential Third-Party program section, below.

2021 Strategies and Successes

In 2021, PG&E's Marketplace website was visited about 239,000 unique times as customers researched home appliance and consumer electronics. Marketplace also provided backup power equipment options in 2021 to support customers impacted by wildfires and Public Safety Power Shutoff (PSPS) events. The most effective strategy for driving customers to the platform was the delivery of customer emails before major appliance and electronic retail sales events. PG&E's Marketplace is also leveraged to cross-promote other programs that offer the customer products and appliances featured on the Marketplace.

Following successful solicitations work in 2021, PG&E selected a vendor to work on PG&E's refresh of the Marketplace. The goal of the refreshed Marketplace is to simplify the customer journey by providing customized product and program recommendations based on the customer's needs and profile.

Residential Third-party Programs

PG&E's Residential Third-party Programs[21] are an integral component of its overall residential sector strategy to help provide customers with energy-efficient solutions and services.

Residential Energy Advisor: Energy Reports (PGE_Res_002c) / Continuous Energy Feedback Program (PGE_Res_002d)

Home Energy Reports / Continuous Energy Feedback Program (CEFP)

Implementer: Oracle

In Q1 2021, PG&E successfully completed the solicitation for a new residential behavior program and launched the Continuous Energy Feedback Program (CEFP) in Q3 2021, replacing the Home Energy Reports Program. HER work being done under Residential Energy

[21] These programs were launched following the Commission-approved solicitations process and meet the third-party program definition as described in Decision 18-01-004.

Advisor was transitioned to CEFP throughout the second half of 2021. More details on the CEFP are provided below.

The Continuous Energy Feedback Program (CEFP) uses multiple behavior-based energy efficiency strategies to support customers in understanding and empowering them to manage and lower their household electricity and gas consumption. This program uses information and customer engagement strategies to prompt non-rebated behavior change that can be measured using randomized controlled trials to validate savings and demonstrate attribution. As a result of their changed behaviors, customers can manage their energy use and energy behaviors, make more efficient purchasing decisions, and take energy related actions to lower their energy use. This program builds upon the legacy HER program by adding numerous enhancements to the customer experience that will be phased in over the course of 2021 to mid-2024.

2021 Strategies and Successes

CEFP received CPUC approval in April 2021 and focused on program launch activities— such as completion of the Implementation Plan—through June 2021. In the second half of 2021, the program launched the following CEFP elements:

- Expanded the existing HER program to 520,000 additional gas customers and 660,000 electric and dual-fuel customers for a total of 2.9 million total recipients
- Incorporated opt-out Bill Forecast Alerts (BFAs), which automatically send customers alerts via e-mail when they are on track for a higher-than-normal bill. In order to measure incremental savings from this element, a separate randomized controlled trial was implemented
- Increased targeting of specific customer segments with personalized marketing modules, including income-qualified programs. Focused on gas savings to help customers mitigate the increasing cost of natural gas
- Implemented a winter seasonal e-mail campaign which drove 7,500 new HEC audit completions

In 2022, the program will launch additional elements of CEFP with the goals of driving increased cost- effective savings and experience during peak hours, including TOU Rate Coach Pilot, HER 3.0, and Video HERs.

Multifamily Energy Savings Program (MESP, PGE_Res_003)

Implementer: TRC

The Multifamily Energy Savings Program (MESP) provides property owners EE upgrade services for multifamily buildings of five units or greater throughout PG&E's service territory. The program provides end-to-end program implementation services, including marketing, outreach, engineering, operations, customer service, data management, and reporting. MESP is tailored to serve multifamily customers, inclusive of smaller properties and underserved regions that will most benefit from property upgrades. The program aims to create new EE opportunities by targeting underserved property stakeholders, while at the same time providing scalability to achieve deeper retrofit opportunities with larger and more modern properties.

2021 Strategies and Successes

The program completed their ramp-up activities during the first quarter of 2021 and has been working to recruit participants with a variety of approaches. In 2021, MESP focused on remote customer outreach by engaging with PG&E's Business Energy Solutions team and players in the industry (for example, homeowners' associations and assisted living facilities). MESP's goal is to deliver cost-effective and persistent energy savings for multifamily properties. The program will continue building out the pipeline of projects and implementation in 2022.

WatterSaver Program

Implementer: Association for Energy Affordability (AEA)

The goal of WatterSaver is to shift 2 MW of demand out of peak period by 2025. Participants who enroll in WatterSaver can optimize their energy use and save money by connecting their water heaters, via internet or cellular data, to the program. WatterSaver automatically takes advantage of lower electricity rates, heating water at less expensive off-peak times of the day. Participants will also receive a $50 gift card for enrolling plus an additional $5 gift card for each month of active participation. Enrolled customers will help increase electric grid reliability and support increased renewable energy generation like solar and wind power by shifting energy use to off-peak times. Though managed by PG&E's EE residential team, WatterSaver is funded separately from other EE programs, through funding authorized under Assembly Bill 2868 of 2016, which was adopted to accelerate the deployment of connected distributed energy storage systems in California.

2021 Strategies and Successes

The CPUC issued Resolution E-5073 in January 2021, granting final approval of the WatterSaver program and allowing PG&E to start formulating a launch strategy. In February 2021, an application for rehearing was submitted to the CPUC, which paused the implementation for 4 months. Following CPUC guidance to move forward, the WatterSaver team has created a program website[22] that will serve to educate and enroll customers, implemented a web-based application, developed a program implementation database, generated an M&V plan, created outreach collateral and training materials, finalized incentive processing systems, and developed device connection processes.

[22] https://www.watter-saver.com/

Commercial Programs

PG&E's commercial EE programs offer non-residential customers a suite of approaches, products, and services to help overcome the market barriers to optimizing energy management. These programs target integrated energy management solutions − including EE, Demand Response (DR), and Distributed Generation (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.

PG&E's commercial EE programs are moving toward the Business Plan goal of ramping down the proportion of rebate and incentive funds to drive EE in favor of meter-based programs and in-house and publicly available financing options. On-Bill Financing (OBF) offers a strong solution to address the cost barriers which drive project decisions. For more details on PG&E's OBF program, see the Financing Programs chapter of this report.

Key Initiatives

PG&E focused on strategies in 2021 that position programs to achieve PG&E's vision for the commercial sector: putting commercial buildings on a path to Zero Net Energy (ZNE) by 2030 for all new construction buildings and for half of existing buildings, and to support communities in response to the ongoing COVID-19 pandemic.

Key initiatives to achieve these goals included:

- Reduced program dependence on incentives and rebates to pursue deeper, more comprehensive savings through meter-based strategies and focus on financing offerings
- Continued evolution toward a meter-based approach, promoting more comprehensive and controls-based project strategies and encouraging conservation beyond just reducing total load, and including usage and behavior as stronger components
- Introduction of meter-based projects, longer-term EE relationship between customers and project developers resulting in a deeper understanding of a customer's EE goals and challenges
- Increased funding for commercial programs that provided SMB customers opportunities to reduce electric usage at their business and the launch of a solicitation for micro and small business customers.

2021 also saw the launch of four Statewide commercial programs, for which PG&E was a participating non-lead IOU. As a result of these Statewide program launches, most of the deemed measures in the local programs were sunset by the end of 2020 so as not to duplicate Statewide offerings. More information on Statewide programs can be found in the Statewide Program Implementation chapter of this report.

As a non-lead IOU, PG&E's goal in 2021 was to redirect the tendencies of customers and project developers to look to PG&E for rebates or incentives on a by-product basis. To inform customers and other market stakeholders of the impending changes to product incentives and new program launches, PG&E set up an internal website with customer-facing resources that

became available in January 2021, which customer relationship managers could use to provide a summary of customer eligibility, products offered, offering process overviews, and contact information for the program implementer. PG&E also continued internal education on program changes, including presentations, links to Implementation Plans, and program websites. The success of commercial programs in 2021 indicates this strategy effectively supported program launches.

Opportunities Moving Forward

As a result of solicitations that began in 2021, PG&E expects to launch its first Equity program, a Micro-Small Business program, in mid-2022. This Equity program aims to achieve increased participation and provide targeted services to customers and regions which have not historically engaged with EE programs. Key characteristics for customers in this underserved segment include a peak demand of less than 50kW, which fit the California Code of Regulations definition of a small business enterprise, and customers located in Disadvantaged Communities. This effort supports California's equity goals, which have been articulated in Senate Bill (SB) 350[23] and the Low-Income Barriers Study,[24] as well as the CPUC's Environmental and Social Justice (ESJ) Action Plan.[25]

Commercial Programs

Serving PG&E's Customers

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

In 2021, third-party programs targeted small and medium businesses, 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 chapter.

Commercial Calculated Incentives Program (PGE21011)

The Calculated program provides financial incentives for non-residential customers to install new equipment or systems which meet or exceed applicable code and/or industry standards in existing buildings when projects don't have a good fit with a third-party program. PG&E's Calculated program includes both customized incentives (formerly "Customized Retrofit") and Retro-commissioning (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.

2021 Strategies and Successes

The Commercial Calculated Incentives program assisted in the transition of projects from other closing programs as part of the shift to the new third-party implementer model, resulting in 21 completed projects in 2021. The role of this program will be diminishing in the future, as the portfolio makes room for new programs and any future third-party programs in this sector.

Commercial Deemed Incentives Program (PGE21012)

The Commercial Deemed Incentives (Deemed) program offers a limited number of prescriptive rebates directly to customers, vendors, or distributors for the installation or sale of energy-

[23] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB350
[24] https://www.energyefficiencyforall.org/resources/low-income-barriers-study-part-a/
[25] https://www.cpuc.ca.gov/news-and-updates/newsroom/environmental-and-social-justice-action-plan

efficient equipment. These measures reach across technology segments including agriculture, HVAC, refrigeration, and water heating, where there is not an overlap with Statewide programs. While reduced, the prescriptive rebate approach continues to fill gaps in other programs and remains an attractive option for smaller projects.

2021 Strategies and Successes

With the retirement of PG&E lighting measures in 2020 and the launch of the Statewide Lighting Program (lead by SCE), this program focuses on delivering a broader offering of EE measure types and attracting new participants. In 2021, PG&E provided enhanced rebates for the acquisition of Ultra Low Temperature (ULT) freezers - specifically to benefit customers and agencies storing COVID-19 vaccinations. Although the enhancement bonus ended in December 2021, the base ULT measure incentive is still available. In 2021, 65 customers took advantage of the enhancement.

The Trade Ally Network, an independent group of non-contracted tradespeople and market influencers, continue to substantially contribute energy savings with training and support from PG&E staff. Support includes training on how to effectively leverage PG&E's OBF program, establish subcontracting opportunities with existing programs, expand the scope of work offered when possible. In 2021, the Trade Ally Network delivered savings through 224 projects and was the largest contributor to OBF program savings. For more details about the OBF program, see the Financing Programs chapter of this report.

Savings by Design (PGE211025)

Savings by Design (SBD) encourages energy-efficient building design and construction practices and promotes the efficient use of energy by offering up-front design assistance, supported by financial incentives. SBD uses the applicable California Building Energy Efficiency Standards (Title 24, Part 6) as reference baselines, and when appropriate, uses other industry standards to determine reference baselines for comparisons. PG&E's SBD program stopped accepting new applications in 2019, except for State of California Partnerships projects.

2021 Strategies and Successes

The SBD program continued to ramp down and complete projects in the program pipeline throughout 2021, with the last project expected to close in 2023. Customers who applied to SBD and had project commitments already in the queue for review and payment will be completed under the established SBD program rules. SBD is being replaced by two new Statewide, third-party implemented non-residential programs: California Design Assistance-Mixed-Fuel (CEDAM) and California Design Assistance-All-Electric (CEDAE) for which PG&E is the lead IOU. CEDAM and CEDAE launched in August 2021, and any lead received for SBD is now transitioned to these Statewide programs. Further details on those programs can be found in the Codes, Standards, and New Construction chapter of this report.

Hospitality Program (PGE210143)

Implementer: Ecology Action

PG&E's Hospitality program offers a comprehensive list of EE measures and services designed to meet the diverse needs of the hospitality, retail, and commercial real estate markets, offering both custom and deemed measures as well as assisting customers with EE projects from start to finish.

2021 Strategies and Successes

Throughout the year, the Hospitality Program offered HVAC, refrigeration, and lighting measures to customers. Though the hospitality segment was challenged by COVID-19 impacts,

some portions of the retail and commercial real estate market continued to use lower occupancy as an opportunity to make EE improvements. The second half of 2021 reflected impacts due to supply chain shortages and shipping delays, delaying projects into 2022. The program stopped accepting new applications in Q4 of 2021 as a start of its ramp down and anticipated closure in February 2022. This program will be replaced by the Commercial NetOne Program, described in the Commercial Third-Party Programs section below.

Commercial Third-party Programs

Commercial third-party programs[26] offer a turnkey approach that continues to deliver savings, serve customer needs, and remain innovative by adapting to changing market needs. In 2021, newly launched third-party programs focused on supporting customers through audits, project design and development, installation planning, coordination with installing contractors, and incentive and financing assistance. This comprehensive approach mirrors the nature of projects in 2021 and beyond, which look at entire buildings or systems rather than a single component. Each of the third-party programs described below focuses on the opportunity to build on previous customer upgrade efforts, obtaining momentum from savings realized at the meter. On-bill and third-party financing also play a larger role in customer choice to move EE planning to actual projects.

CoolSave Grocery Comprehensive Retrofit & Commissioning (PGE_Com_001)

Implementer: kW Engineering

CoolSave Grocery Comprehensive Retrofit & Commissioning (GCx) targets the energy intensive supermarket sector. The program optimizes scheduling and controls of commercial refrigeration and HVAC controls, lighting, cooking, and packaging, with a mix of low- or no-cost RCx recommendations and capital investment equipment projects. This is a meter-based and pay-for-performance program which uses the NMEC approach to calculate savings.

2021 Strategies and Successes

CoolSave GRCx launched in January 2021. Despite ongoing challenges with food supply and staff shortages in the grocery sector, the program was successful in stimulating new project interest in the market; customer engagement, audits, and system monitoring identified a pipeline of over 30 projects for 2022.

Smart Labs (PGE_Com_002)

Implementer: kW Engineering

The SmartLabs program specializes in laboratory ventilation system optimization. It offers lab owners expert technical assessments and the development of a performance management plan, including extensive hazard reports which establishes the foundation for adjustments to ventilation, fume hoods, and controls, as well as performance-based incentives to drive product completion. This is a meter-based and pay-for-performance program which uses the NMEC approach to calculate savings.

[26] These programs were launched following the Commission-approved solicitations process and meet the third-party program definition as described in D.18-01-004.

2021 Strategies and Successes

The Smart Labs program launched in January 2021, and despite the significant COVID-19 impacts to the sector, was able to secure 4 projects for installation and savings delivery in 2022. A unique characteristic of this market is that equipment improvement projects, and the scope of work within them, are dictated by what specific research is being done and on what schedule. Energy savings projects are identified and developed, then await their opportunity to move forward as the research schedule allows.

NetOne (PGE_Com_003)

Implementer: Ecology Action

The NetOne Commercial Efficiency Program is a downstream program that provides energy efficiency services, technical services, and incentive processing. Primarilty serving the commercial real estate and retail markets, NetOne provides a suite of incentives to commercial customers to install refrigeration, HVAC, lighting, and meter-based energy savings using the Deemed, Custom, and NMEC platforms. The broad offering also puts NetOne in the position of accepting project types and sizes from a wide variety of market segments.

2021 Strategies and Successes

Since its launch in January 2021, the NetOne program has built a strong pipeline for 2022. While lighting is part of the technology mix, this program has a strong focus on a select set of refrigeration and HVAC targets. Product supplies for this strategy have picked up momentum in 2022 and are on track to meet program demand.

Advanced Energy Program for High Tech & Biotech (PGE_Com_004)

Implementer: Resource Innovations (formerly known as Nexant)

The Advanced Energy Program (AEP) supports PG&E's high-tech and biotech customers in achieving next-generation energy performance by providing comprehensive support, multi-stage strategic engagements, expert technical assistance, innovative incentives and financing solutions, and turnkey project implementation.

2021 Strategies and Successes

The Advanced Energy Program was launched in April 2021 and encountered a strong interest in electrification in this sector through the year. 2021 included a steady flow of audits and feasibility studies which resulted in both system and building level energy projects. With comprehensive custom approach, AEP secured a pipeline of 14 projects for completion in 2022.

Healthcare Energy Fitness Initiative (PGE_Com_005)

Implementer: Resource Innovations (formerly known as Nexant)

The Healthcare Energy Fitness Initiative Program (HEFI) supports PG&E's healthcare customers to optimize the energy performance of their complex and sensitive facilities by providing concierge-level support, multi-stage strategic engagements, expert technical assistance, innovative incentives and financing solutions, and turnkey project implementation.

2021 Strategies and Successes

The HEFI program launched in April 2021 and was introduced into a healthcare market largely focused on the impacts of COVID-19. Facility staff typically focused on energy savings measures spent much of their time adjusting or modifying building spaces to accommodate an increased ventilation load and additional safety protocols. As the healthcare sector recovered, HEFI was able to commit 7 projects to deliver savings in 2022.

Public Programs

Public sector programs support both local governments and public institutions in meeting their energy efficiency (EE) goals. Local Government Partnership (LGPs) are programs led by third-party implementers, local governments or entities that have relationships with local governments. LGPs are generally focused on promoting EE within local government facilities and helping local governments implement California's EE objectives. The third-party implementers concentrate on resource acquisition activities that directly procure energy savings, mainly centered around small and medium business customers that are hard-to-reach and/or in disadvantaged communities.

In 2021, PG&E administered eight LGP programs, covering 30 counties. The LGPs offer comprehensive solutions that reflect the communities' needs. PG&E's partnerships with local governments and their communities help to shape EE and sustainability at the local, regional, and statewide level by meeting the needs of local governments, as well as educational institutions like K-12 public schools. Each individual program is described in the LGP section below. Public institution programs include those focused on the government entities themselves, such as state and local government buildings, and those focused on facilities such as water treatment plants and schools.

In addition, PG&E administered four institutional statewide partnership programs with California Community Colleges, University of California/California State University (UC/CSU), the State of California, and the California Department of Corrections and Rehabilitation. Following a solicitation, PG&E launched the statewide State of California Energy Strategy and Support Program (SOC ESS) in September 2021.

Key Initiatives

Statewide Program Solicitation and Launch
In 2021, PG&E concluded its solicitation for the statewide institutional partnership program it leads, and successfully launched the program, SOC ES&S. More details can be found in the Third-Party Institutional Partnership Programs section of this chapter and in the Statewide Program Implementation chapter of this report.

Institutional Partnership Programs

Institutional partnership programs, designed across the four California Investor-Owned Utilities (IOUs), serve agencies of the State of California and state educational institutions. The objective of institutional partnership programs is to reduce energy usage through facility and equipment improvements and share best practices among state institutions. There were four institutional partnership programs in 2021, all of which will be replaced by statewide third-party programs.

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 and aggressive Zero Net Energy (ZNE) goals, the state is well positioned to make significant progress toward reducing energy usage and the overall carbon footprint of its facilities and infrastructure. PG&E's institutional partnership programs focused on achieving energy savings and supporting demand-side management (DSM) integration and coordination.

California Community Colleges (CCC, PGE2110011)

The California Community Colleges/Investor-Owned Utility Energy Efficiency Partnership (CCC Partnership) advocates, promotes, and supports EE in the California Community College system by leveraging resources from the community college districts, the Community College Chancellor's 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 EE projects. The partnership pursues common goals of long-term energy use reduction, cost savings, and fostering a more sustainable future.

2021 Strategies and Successes

The CCC Partnership participated in virtual quarterly campus forums in both Northern and Southern California, serving as a venue for districts to share successes and strategies to address the shared challenges faced for facilities management and energy efficiency. The partnership team presented at these forums, providing timely updates on modern technologies, information on program implementation, and direct assistance to districts in attendance.

In 2021, the partnership focused on identifying and using new project funding streams, using virtual formats to provide outreach and technical support, and working closely with the CCC Chancellor's office. Funding authorized through Proposition 39 (the Clean Energy Jobs Act of 2012), which had previously been a source of funding for projects identified through the CCC Partnership, ended in July 2021—slowing the identification of new projects. Due to the COVID-19 pandemic, participants in the partnership also adapted to virtual operations, and experienced project delays and suspension of in-person operations.

PG&E's CCC Partnership program is expected to close in 2022 to transition to a statewide third-party program that will include the California community colleges. This new program will be led by SCE and is expected to launch mid-2022.

University of California and California State Universities (UC/CSU, PGE2110012)

The UC/CSU/Utility Energy Efficiency Partnership is a statewide program that includes California's four IOUs, the University of California (UC), and the California State University (CSU). The program generates energy savings through by identifying and implementing retrofit, commissioning, and new construction EE projects.

2021 Strategies and Successes

The UC/CSU Partnership's successes in 2021 included developing and implementing normalized metered energy consumption (NMEC) projects that use a whole-building approach to drive deep savings, address barriers to EE, continue a second phase of UC's Million Lamps Challenge, an LED lighting retrofit initiative, and begin work on a CEC grant to develop a Master Enabling Agreement for EE at UC and CSU campuses, which would support future EE efforts.

The COVID-19 pandemic resulted in projects remaining on hold as in-person operations were suspended. The pandemic created additional strain on campus budgets, slowing the development and implementation of new and ongoing projects. Additionally, utilities and campuses faced engineering challenges to account for the impact of the pandemic on energy usage in calculating EE savings.

The UC/CSU Partnership program is expected to close in 2022, and work will transition to a Statewide third-party program led by SCE. This new program was in active solicitations throughout 2021 and is expected to launch in 2022. New construction opportunities previously supported by this partnership will be served by the Statewide New Construction third-party programs. More details on these programs can be found in the Codes, Standards, and New Construction chapter of this report.

State of California Partnership (PGE2110013)

The State of California IOU Partnership is a statewide program designed to achieve long-term energy and peak demand savings and establish a permanent framework for sustainable, comprehensive energy management programs at state facilities served by California's IOUs. The IOUs work collaboratively with the Department of General Services (DGS) and coordinate with the established pool of Energy Service Companies to support implementation of comprehensive facility EE projects. The IOUs also work with individual state agencies on technology-specific projects. DGS leverages the Department of Finance Energy $mart program, along with the IOU on-bill financing, incentives, and rebates, to provide financing for projects.

2021 Strategies and Successes

In 2021, the IOUs and DGS made process updates to address barriers to state buildings' participation in EE new construction programs, building on lessons learned in a 2020 working group. While existing projects will remain in the IOUs' legacy nonresidential new construction program, Savings By Design, new projects will transition to the new statewide Nonresidential New Construction program, led by PG&E, which launched in 2021.

The IOUs also continued to support state agencies in implementing Executive Order B-18-12 by providing access to their energy data for benchmarking. The Partnership has provided outreach and technical support to agencies including California Highway Patrol, Department of Motor Vehicles, Department of Parks and Recreation, Judicial Council of California, and Department of Food and Agriculture. In response to the Public Safety Power Shutoffs, the Partnership also coordinated on how to build resiliency for sites in the most critical zones.

The State of California partnership program is closed to new applications as of late 2021, upon the launch of the statewide third-party program, Statewide State of California Energy Strategy and Support Program, led by PG&E and described below. Legacy applications will remain in the previous partnership program to meet customer commitments and for continuity.

California Department of Corrections and Rehabilitation (PGE2110014)

The California Department of Corrections and Rehabilitation/IOU (CDCR/IOU) Partnership is a aims to save energy and reduce peak demand in the near term, and establish a permanent framework for comprehensive energy management programs at CDCR institutions served by California's four large IOUs. The partnership utilizes the resources and expertise of CDCR and IOU staff and. leverages the existing contractual relationship between CDCR and Energy Service Companies to develop and implement energy projects in CDCR facilities.

2021 Strategies and Successes

In 2021, CDCR continued implementing retrofit projects and performing Investment Grade Audits. The IOUs and the partnership's Program Administration Manager 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 used to prioritize the next wave of projects.

The CDCR partnership program is closed to new applications as of late 2021, upon launch of the statewide third-party program, SOC ESS, led by PG&E and described below. Legacy applications will remain in the previous partnership program to meet customer commitments and for continuity.

Third-party Statewide Partnership Programs

PG&E completed its solicitation of the Statewide State of California Third-Party program in 2021. This Statewide program successfully launched in 2021 and will support all state agencies in various capacities.

State of California Energy Strategy and Support Program (PGE_SW_IP_Gov)

Lead IOU: PG&E

Implementer: AESC

SOC ESS opened to customers in September 2021. SOC ESS helps California State Agencies (excluding higher education, which will be served by a statewide program led by SCE) reach their greenhouse gas (GHG) emission reductions goals while reducing energy use through EE and integrated demand-side management project planning, technical support, and financial assistance. The program builds on the State's successful existing approaches while adding new channels to address key barriers California state agencies. SOC ESS is designed to overcome structural and operational barriers related to staffing and capacity, capital and financing, and safety to ensure successful realization of energy savings in state buildings.

The Program offers two pathways with varying levels of support. Pathway 1 provides agencies that are committed to a minimum level of energy savings and program engagement with high-touch, customized, and strategic portfolio-wide and engineering support plus staff augmentation. Pathway 2 provides support on individual projects as identified and pursued. Additionally, the Program continues to provide all agencies with the services they relied on through the prior statewide partnership programs, including financial, policy, technical, project, and program application support.

2021 Strategies and Successes

In 2020, PG&E began the solicitations process for the Statewide State of California Program offering. PG&E completed the solicitation and submitted an advice letter[27] seeking Commission approval of the program contract in June 2021, which was approved in July 2021. PG&E posted the program Implementation Plan in October 2021 and officially launched the program to customers in Q4 2021.

[27] PG&E Advice 4456-G/6236-E

Local Government Partnership Programs

The Local Government Energy Action Resources (LGEAR) program, originally slated for closure in February 2022, was extended through 2022 to continue serving customers during transitions to third-party programs. LGEAR includes administration of direct install programs and provides low-cost or no-cost energy savings solutions. It has traditionally served small-to-medium-sized business (SMB) customers. This program is expected to close in December 2022, with the transition to a new third-party Micro-Small Business Program. For more details on the Micro-Small Business program solicitation, please see the Commercial Programs chapter of this report.

Local Government Energy Action Resources (LGEAR) Direct Install Program (PGE2110051)

Implementer: Staples Energy

The LGEAR program provides funding for commercial direct install (DI) projects. Specifically, LGEAR gives SMB customers the opportunity to have a third-party contractor retrofit existing systems with energy-efficient equipment at low or no cost. Because many small business customers have short-term leases and do not own the energy-using equipment they pay bills for, this program addresses the needs of SMBs and overcomes the barriers of limited capital, expertise, and understanding of EE benefits.

2021 Strategies and Successes

In 2021, PG&E retained one implementer to continue to offer commercial DI services through LGEAR, to continue serving SMBs while the solicitation for PG&E's new Micro-Small Business Equity Program is underway. Despite COVID-19's impacts on SMBs' building access and business cash flow, the program continued to deliver strong savings for customers. This program will close in September 2022, and transition to the Micro-Small Business Equity program.

Third-party Local Government Partnership Programs

PG&E had eight LGPs that were active in 2021, serving approximately 30 counties. The third-party[28] LGP programs launched in July 2020. Through LGPs, PG&E and local and regional partners work together to develop and implement programs that serve the public sector and the broader community, including SMBs and non-profit customers. LGPs are the primary delivery channel supporting cities, counties, and other local agencies seeking energy savings and GHG emission reductions on a community scale. Promoting energy planning at a statewide and local level is a major market driver in increasing local government uptake of 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 they serve. While local governments represent most lead local partners, some LGPs are led by local economic development groups, associations of governments, joint power authorities, or 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

[28] These programs were launched following the Commission-approved solicitations process and meet the third-party program definition as described in D.18-01-004.

identify customers who can benefit from EE programs within their communities and effectively partner with program implementers to overcome barriers to EE adoption.

Central California Energy Watch (CCEW, PGE_Pub_004)

Implementer: San Joaquin Valley Clean Energy Organization

The Central California Energy Watch is a non-resource program covering cities, counties, special districts and K-12 school districts in the counties of Kings, Tulare, Stanislaus, San Joaquin, Merced, Fresno, Kern, Monterey, and Madera. The CCEW is designed to identify energy savings opportunities in public sector infrastructure, develop and deliver project leads to one of PG&E's third-party direct installers, and develop short, mid-term and long-term energy efficiency project pipelines. The CCEW focuses on helping hard-to-reach (HTR) and Disadvantaged Communities (DAC) access, understand, and participate in EE through IOU-administered third-party programs.

2021 Strategies and Successes

For 2021, CCEW focused on building on the multi-chaptered Energy Action Plans for the County of Monterey and City of Fresno, helping both agencies to identify project opportunities for energy efficiency. The program delivered 15 episodes of "Fund-it-Fast" chats, helping to break down the barriers to understanding energy efficiency funding and financing. This included three bonus Fast Chats with the Government and K-12 Program (GK-12, described in the Third-Party Public Sector Programs section below) team.

In further collaboration with GK-12, CCEW introduced the program to public agencies throughout the territory, resulting in multiple projects with the cities of Arvin and Taft. The "companion programs" co-presented to the Multi Jurisdiction Climate Action Council for Monterey County. The program continues to support agencies through benchmarking all electric and gas accounts, using the data to build qualified leads for our GK-12 partner. Looking to the future, the program will continue to drive projects in hard-to-reach and disadvantaged communities, hoping to help our communities take advantage of the heat pump water heater campaign, as well as PG&E's core program offerings.

Central Coast Leaders in Energy Action Program (CC-LEAP, PGE_Pub_001)

Implementer: The Energy Coalition

The Central Coast Leaders in Energy Action Program (CC-LEAP) offers energy efficiency project delivery services within the County of San Luis Obispo and parts of the County of Santa Barbara served by PG&E. CC-LEAP is a no-cost resource hub that helps public agencies to complete energy upgrades expeditiously and cost-effectively. CC-LEAP not only provides connections and resources, but also directly supports energy projects with project management, engineering, and financing support services. CC-LEAP is driven by the following three objectives: to expand the implementation of cost-effective energy efficiency projects, make energy efficiency expertise accessible and available, and integrate energy efficiency as a standard business practice for public agencies.

2021 Strategies and Successes

In 2021, CC-LEAP helped public agencies identify and implement multiple energy efficiency projects and energy action planning processes. With CC-LEAP's technical assistance, 38 Central Coast facilities were benchmarked in Energy Star Portfolio Manager, with 10 submitted to the California Energy Commission for AB802 compliance. This benchmarking effort identified multiple high-opportunity sites for CC-LEAP to audit for energy efficiency opportunities. CC-LEAP worked to identify measures, analyze project financials, and submit projects into PG&E's

On-Bill Financing (OBF) program. CC-LEAP also delivered educational webinars and email campaigns highlighting facility benchmarking, energy-related calendar events, funding/financing opportunities, and strategies for navigating the evolving energy efficiency program landscape.

Energy Access SF (PGE_Pub_006)

Implementer: City and County of San Francisco

EnergyAccess SF is a partnership between PG&E and the City and County of San Francisco, Department of the Environment (SFE). EnergyAccess SF supports energy saving opportunities for HTR and DAC customers and seeks to build capacity to help save energy community-wide. The partnership aims to increase EE participation in residential and HTR small and medium businesses (SMBs); influence customers to take energy efficiency actions; drive well-qualified leads to third-party, PG&E, and Bay Area Regional Energy Network programs; and reduce customer acquisition costs and achieve deeper energy savings for PG&E programs.

2021 Strategies and Successes

The EnergyAccess SF program began with a soft launch in May 2021 by sending mailers to targeted potential customers Program staff translated outreach material into Chinese and Spanish to reach customers who do not speak English as a primary language at homes or businesses, and the program also refined its outreach methods based on customer feedback and lessons learned. Throughout the remainder of 2021, staff continued to follow up with targeted customers.

Marin Energy Watch Partnership (PGE_Pub_002)

Implementer: County of Marin - Community Development Agency

The Marin Energy Watch Partnership's (MEWP) key objectives are to support public agencies to understand energy use and achieve energy savings, and to connect local HTR communities to available energy efficiency programs. MEWP offers three overarching programs: Public Agency Climate Action Plans, Public Agency Energy Efficiency Support, and Empowering HTR Communities.

MEWP's programs support PG&E by acting as a proven trusted advisor to Marin's public sector and HTR customers. MEWP focuses on building trust and relationships with public sector staff to assist them in identifying opportunities and navigating EE programs and financing opportunities, using existing networks and established relationships in the community.

2021 Strategies and Successes

Highlights for program year 2021 include the completion of several Proposition 39 final reports for Marin school districts. The Energy Watch also supported the adoption of the Town of Fairfax's Climate Action Plan 2030 and assisted all twelve Marin jurisdictions in the completion of the 2019 GHG inventories, resulting in consistency and coordination on countywide emissions reporting and reduction efforts. Progress was also made in 2021 in building the relationship with the GK-12 Program (described below), including referrals of county and water district potential projects.

Redwood Coast Energy Watch (PGE_Pub_003)

Implementer: Redwood Coast Energy Authority

Redwood Coast Energy Watch (RCEW) serves the Humboldt County region. RCEW is intended to overcome the geographic barriers that affect the customers of the region and to lead customers to more comprehensive energy actions. The primary objective is to support cost-effective resource acquisition program services to public and commercial HTR customers while growing local EE capacity. RCEW serves public agencies, non-residential HTR customers, and

residential HTR customers. The program applies innovative approaches to enroll customers and build trusting relationships, with an end goal of motivating participants to continue pursuing deeper retrofits in the future. RCEW aims to drive comprehensive public agency energy projects, increase cost-effectiveness for resource acquisition programs, increase opportunities for HTR customers to save energy, integrate deep-reaching energy projects with demand side management, and build local capacity for EE through education.

2021 Strategies and Successes

In 2021, RCEW focused on outreach, service delivery, and process development. In the second half of 2021, RCEW ramped up outreach efforts in response to reduced program uptake as many agencies and businesses remained impacted by COVID conditions. RCEW provided services to the Yurok Tribe and the County of Humboldt, including delivering leads for OBF projects. RCEW submitted CalSHAPE (AB 841) applications for four schools. RCEW served the Wiyot Tribe, Bear River Rancheria, and several cities with services including loan coordination work with the CEC, procurement support, support with public works requirements, data analysis, and prepping bid documents.

San Mateo County Energy Watch Program (PGE_Pub_005)

Implementer: City/County Association of Governments of San Mateo County (C/CAG), administered by the County of San Mateo Office of Sustainability

The San Mateo County Energy Watch Program (SMCEW) serves the public and commercial market sectors across San Mateo County. Specifically, SMCEW assists municipalities, special districts, public agencies, K-12 public schools, and small, HTR businesses in accessing EE programs, trade professional networks, and financing opportunities. SMCEW provides coordination, outreach, referrals, and educational resources to help community members pursue EE projects. SMCEW runs a public facility quarterly working group to help facility staff increase their understanding of energy efficiency and energy management. Through San Mateo County's Regionally Integrated Climate Action Planning Suite initiative, SMCEW assists cities in reducing energy use and achieving GHG reduction goals. SMCEW hosts a monthly climate action working group for sustainability staff; develops annual community GHG inventories; and supports staff in developing, implementing, and tracking climate action plans.

2021 Strategies and Successes

In 2021, the SMCEW focused on assisting HTR small businesses. This included contacting target businesses by phone, sharing information about SMCEW and other County of San Mateo Office of Sustainability (OOS) small business programs, and beginning a partnership with El Concilio (a community-based organization) to visit businesses in person to introduce SMCEW offerings. To support small business outreach efforts in the field, OOS also developed a contacts database and mobile app. SMCEW made progress assisting municipalities, including referring the City of Millbrae to the RAPIDS wastewater treatment optimization program (described below) and connecting the several cities with a heat pump water heater pilot. Twelve HPWHs were installed by the end of 2021.

SMCEW also supported development of the San Mateo County Office of Education's Environmental Literacy and Sustainability Initiative.SMCEW shared information about its program and other OOS school programs with school districts

Sierra Nevada Energy Watch (SNEW, PGE_Pub_007)

Implementer: Sierra Business Council

The Sierra Business Council's Sierra Nevada Energy Watch (SNEW) program furthers PG&E and CPUC EE goals through EE project development activities, planning and policy work, and

outreach/education efforts. These program activities motivate public sector leaders and SMBs to increase their capacity for EE action, especially in the rural Sierra Nevada counties and their HTR communities and DACs.

2021 Strategies and Successes
SNEW moved into program steady state activities starting January 2021. Over the course of the year, SNEW prioritized relationship-building with 14 county public agencies and SMBs. SNEW developed and implemented a strategy to maximize and refine contact development and outreach to identify projects and generate leads. This strategy resulted in increasing SNEW's involvement in project management, energy analysis and planning, technical assistance, and service as a 3P/TradePro liaison for SNEW public agencies.

Sonoma Public Energy (PGE_Pub_008)

Implementer: County of Sonoma
The Energy and Sustainability Division of Sonoma County developed "Sonoma Public Energy", a suite of comprehensive services aimed primarily at the reduction of energy use, reduction of energy cost, and assistance with access to existing and future resources and services. These services are focused on facilitating upgrades to public facilities, K-12 Schools, special districts, and HTR and DAC customers located within Sonoma County.

2021 Strategies and Successes
In 2021, Sonoma Public Energy completed the development of its Energy Efficiency Roadmap, engaged multiple municipalities and non-profit organizations linking them with PG&E EE Programs, and furthered its own engagement with other PG&E EE offerings. Sonoma Public Energy's efforts stand to influence improvements to publicly owned facilities, and Sonoma Public Energy plans to make its Energy Efficiency Roadmap tool available to school districts through development of a web portal.

Third-party Public Sector Programs

Following the successful completion of the solicitations process that began in 2019, two third-party resource programs[29] were added to the public sector program offerings. These public sector programs target publicly funded entities that receive revenue from state and local governments or are local governments themselves.

Government and K-12 (GK-12) Comprehensive Program (PGE_Pub_009)

Implementer: Willdan Energy
The Government and K-12 program includes a broad offering of EE measures to diverse markets of local governments and K-12 public and charter schools. GK-12 has a strong focus on electrification, which aligns with substantial interest in the government and K-12 sectors. Utilizing all project application channels (deemed, customized, and NMEC) the program offers HVAC and Lighting equipment and control system upgrades, retrocommissioning recommendations, and behavioral strategies to optimize system efficiencies. The program is designed to cost-effectively complete all sizes and scopes of projects and has a goal of engaging nearly half of its customers from the HTR and DAC sectors.

[29] These programs were launched following the Commission-approved solicitations process and meet the third-party program definition as described in Decision 18-01-004.

2021 Strategies and Successes

The program officially launched in January 2021, at a time when COVID-19 pandemic management was the top priority for its customer base. Despite that challenge, the GK-12 program was able to identify substantial interest in electrification, starting with water heating and build out a pipeline.

RAPIDS Wastewater Treatment Optimization Program (PGE_Pub_010)

Implementer: AESC

The RAPIDS program targets the wastewater treatment and collection system market, offering technical analysis, design assistance, project development support, incentives, and financing. While the program does offer capital project solutions, it also focuses on the cascading effects of operational measures on downstream energy, process loads, and operational efficiency. Development of an action plan, including an ongoing system monitoring strategy, can contribute to energy savings persistence for customers. The program considers the operation of clarifiers, blowers, pumps, filters, and dewatering processes to optimize the complex interaction between systems and flow volumes.

2021 Strategies and Successes

The RAPIDS program officially launched in January 2021 and reached out to public wastewater agencies to build a strong pipeline of projects. RAPIDS also partnered with a PG&E-contracted IDSM Services platform to integrate demand response into EE projects and provide additional assistance in identifying and conveying customer opportunities to shed load when required in support of statewide load reduction goals.

Industrial Programs

California's industrial sector is extremely diverse and, in most cases, tend to be heavy energy users. In 2021, PG&E supported customers in 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's programs focused on EE solutions for its industrial sector to help reduce energy consumption and GHG emissions while increasing customers' profitability by lowering energy costs.

PG&E's industrial EE programs also 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 Integrated Demand-side Management (IDSM) opportunities such as Demand Response (DR) and Distributed Generation (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.

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 programs focused on specific technologies, segments, or approaches with specialized requirements.

Key Initiatives

While industrial 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 programs are thoughtfully designed, and offerings align with customers' requirements.

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 the Energy Advisor Program, to financial offerings to install EE projects through the calculated, deemed, or financing programs.

In 2021, gas savings were primarily attributed to oil production, while electric savings were primarily credited to improved process modification and controls, and pump and fan retrofits. Highlighting the various cost savings and non-energy benefits associated with reduced maintenance of higher efficiency equipment was a successful method of championing EE projects within all industrial sectors.

Opportunities Moving Forward

In 2022, PG&E's goal for industrial programs is to work towards high industrial customer satisfaction for program participants. Strategic Energy Management (SEM) programs yield high energy savings and customer satisfaction; PG&E will be working to increase participation in the two existing industrial SEM programs, and will look to expand beyond the industrial sector, as outlined in PG&E's 2024-2031 Energy Efficiency Strategic Business Plan Application (A.22-02-005). PG&E's industrial SEM programs are described in more detail, below.

Industrial Programs

Industrial Calculated Incentives Program (PGE21021)

The Industrial Calculated Incentives program 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, industry standard practice, 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.

2021 Strategies and Successes

In 2021, PG&E continued to ramp down legacy programs and transition to the new third-party programs. The role of this program will be minimized to allow the new third-party programs to operate in this sector. Projects remaining in the program are legacy projects to fulfill customer commitments and provide continuity.

Industrial Deemed Incentives Program (PGE21022)

The Industrial Deemed Incentives program 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.

2021 Strategies and Successes

There is an increasing need for custom solutions in the industrial space, and the Deemed program is expected to play a smaller role in supporting industrial customers. PG&E expects the newly launched third-party programs to be the primary resource for customers looking to take advantage of deemed incentives.

Heavy Industry Energy Efficiency (HIEEP) Program (PGE21027)

Implementer: TRC

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.

2021 Strategies and Successes

In 2021, HIEEP's focus was the completion of existing projects in the pipeline and the smooth transition of projects in development to appropriate third-party programs. Due to the size of the project pipeline and long project lifespans, PG&E prioritized fulfilling customer commitments by slowly ramping down HIEEP through the year, until it closed in December 2021. Customers in these segments are now served by two new Industrial third-party programs – Business Energy Performance (BEP) and Industrial Systems Optimization Program (ISOP) – described below.

Industrial Refrigeration Performance Plus Program (IRPP, PGE21036)

Implementer: VaCom Technologies

IRPP serves 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.

2021 Strategies and Successes

IRPP was closed to new applications in 2020 but remained active in 2021 to issue legacy incentive payouts on completed projects. IRPP completed all customer commitments and closed in December 2021.

Industrial Retrocommissioning Program (PGE210210)

Implementer: Nexant, Inc. (Currently operating as Resource Innovations)

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 serves 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. 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 program's consultants and service providers allow the program to provide industries with the most comprehensive energy solutions available.

2021 Strategies and Successes

In 2021, IRCx's focus was the completion of existing projects in the pipeline and the smooth transition of projects in development to appropriate third-party programs. PG&E prioritized fulfilling customer commitments by slowly ramping down IRCx through the year, until it closed in December 2021. Customers in these segments are now served by two new Industrial third-party programs – Business Energy Performance (BEP) and Industrial Systems Optimization Program (ISOP) – described below.

Industrial Strategic Energy Management

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 program activities at the facility, including capital projects, maintenance and operation improvements, as well as retro-commissioning. The methodology and program requirements were defined through a collaborative effort between the IOUs, CPUC, and external subject matter experts.

SEM Food Processing (PGE_Ind_001a)

Implementer: CLEAResult

The SEM Food Processing program serves food processors and producers and takes a whole-facility approach that uses NMEC and dynamic baseline modeling to determine energy savings from all program activity at the facility, including capital projects, custom and deemed calculated retrofits, maintenance and operation, and retro-commissioning projects. The program requires a multi-year customer commitment to participation in multiple cohort training workshops, individual or cohort energy analysis, and Measurement and Evaluation (M&V) activities based on information and characteristics of the facility's specific processes.

2021 Strategies and Successes

In 2021, PG&E completed the entire set of activities defined in the California Industrial SEM Guide for the first 12-month program cycle for existing and new cohorts of participating customers. Long-term customer engagement and the strategic positioning of facility staff as energy efficiency experts became a major goal for the program. Continuous energy improvement and what actions should be taken to complete project action plans were constantly discussed at workshops and during site visits.

Upon completion of the first program cycle, PG&E developed and submitted comprehensive reports with extensive statistical modeling and calculations for all participants. As a result of using the SEM approach and the high quality of services provided, 80% of participating customers completed major energy efficiency projects and substantially reduced energy usage. Along with advanced energy efficiency opportunities, customers were introduced to the fundamentals of IDSM and energy information systems, leading to a more comprehensive approach to each facility's energy management. In addition, the SEM Food Processing program is continuing recruitment to form a new cohort for 2022-2023.

SEM Manufacturing (PGE_Ind_001b)

Implementer: Leidos, Inc.

The SEM Manufacturing program combines cohort participation, individual site visits, and web-based activities to deliver program services to participating industrial manufacturing customers. Customers receive frequent communications identifying major opportunities for implementation, and the program rigorously tracks energy usage before and after energy efficiency actions are performed to determine effectiveness and persistence.

2021 Strategies and Successes

In 2021, the SEM Manufacturing program completed its 12-month scope consisting of workshops, site-specific activities, and energy management assessments for each program participant. PG&E also completed regression analyses and modeling to identify and report energy savings to program stakeholders and evaluators. During multiple web-based sessions with customers, PG&E evaluated the impacts of energy efficiency on processes and production metrics, dialing directly to customers' Human Machine Interface (HMI) tools and providing recommendations for process improvements. PG&E also conducted customer satisfaction

surveys following each workshop; the program has maintained an average customer satisfaction score of 4.5-5.0 out of 5.0 since launching.

The program has also expanded customer outreach and now includes participants representing high-tech and biotech manufacturing facilities, which served a new cohort of customers in 2021 that will continue through 2022. Simultaneously, the program will continue working with current customers to implement new SEM designs for program cycle years three and four. The new cycle includes introduction to advanced opportunities of IDSM and advanced energy management systems.

Industrial Third-party Programs

Industrial third-party programs[30] offer a thoughtful, niche approach that continues to deliver savings, serve customer needs, and stay innovative by adapting to changing markets.

Industrial Compressed Air System Efficiency Program (ICASE, PGE210212)

Implementer: ALDI

The ICASE program was selected as an innovative program for the IDEEA 365 solicitation process. The program serves 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 maintaining efficiencies that have been initially gained by implementing an EE project.

2021 Strategies and Successes

The ICASE program 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. For customers that met the system size criteria, ICASE concentrated on optimizing system performance, aiming to improve compliance or exceeding codes, standards, and industry standard practices to achieve customer savings.

Business Energy Performance (BEP) Program (PGE_Ind_002)

Implementer: CLEAResult

The Business Energy Performance (BEP) Program provides energy efficiency services, technical assistance, and incentives to the industrial sector within PG&E's service territory. BEP targets the Petroleum, Chemical, and Minerals subsegments using a downstream market approach and by leveraging the Deemed and Custom savings platforms to deliver cost-effective energy savings. BEP also promotes and leverages On-Bill financing (OBF) as a tool to off-set the barrier of capital to fund projects. More information on OBF can be found in the Financing Programs chapter of this report.

2021 Strategies and Successes

Following a smooth program launch at the end of 2020 and beginning of 2021, BEP immediately created program and marketing materials and started to reach out to customers. After a year where the PG&E portfolio was focused on closing out existing projects and programs, it was

[30] These programs were launched following the Commission-approved solicitations process and meet the third-party program definition as described in Decision 18-01-004.

important to promote customers awareness of this new program and its opportunities. BEP was successful in doing so and was able to engage and/or develop projects with 79 customers, commit 3 projects, and complete 14 projects in 2021.

Industrial Systems Optimization Program (ISOP, PGE_Ind_003)

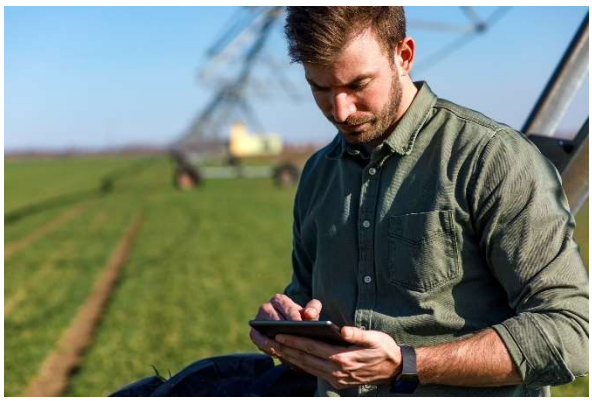
Implementer: Cascade

The Industrial Systems Optimization Program (ISOP) serves the industrial manufacturing and food processing market segments throughout PG&E's territory, focusing on training, retro-commissioning, and capital projects with systems-level optimization. ISOP offers technical support to identify and implement projects, energy management coaching, energy management and collaboration software, and ongoing energy coach support to drive projects. The program uses deemed, custom, and meter-based platforms (where applicable) to achieve savings, and supports all relevant measure types, with a focus on complex mechanical systems such as refrigeration, compressed air, pumping, fans, blowers, boiler and steam systems, and the industrial processes they serve.

2021 Strategies and Successes

The preparation and public posting of ISOP's Implementation Plan was completed in December 2020, and the program officially launched in January 2021. Following a successful program launch, ISOP ramped up customer outreach and finalized program materials, including enrollment agreements for their two-track customer engagement model. Throughout the course of the year, ISOP connected with 58 industrial customers and completed 10 projects, varying across deemed, custom, and NMEC platforms. ISOP also took on several in-flight committed custom projects transferred from previous third-party programs that are now closed, providing customers with continuity and support.

Agricultural Programs



In 2021, PG&E's agricultural programs provided a portfolio of offerings to support an industry impacted by fluctuating availability of surface water and increasing oversight on ground water pumping. The EE agricultural programs, coupled with Demand Response (DR) and Distributed Generation (DG) programs, helped agricultural producers and processors manage energy costs and make informed investments in new equipment. PG&E offered a full suite of tools to position California agricultural customers to eliminate unnecessary energy use, including 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.

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. In 2021, PG&E programs served 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.

Key Initiatives

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 California State University, Fresno and California Polytechnic State University, San Luis Obispo (Cal Poly).

Increased outreach to California's diverse agricultural sector. Following third-party program launch, the priority for 2021 was to create program documents and marketing materials with the goal of connecting with and educating as many customers as possible on the new program offerings.

Opportunities Moving Forward

PG&E continues to support a geographically widespread and diverse market with opportunities that support customer and grid resiliency. With customer interest in decreasing demand and electrifying equipment in mind, PG&E plans to educate and support customers with innovative EE and Integrated Demand-side Management (IDSM) opportunities, as part of the larger effort to make the grid safer and more reliable.

Agricultural Programs

Agricultural Calculated Incentives Program (PGE21031)

The Agricultural Calculated Incentives program 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.

2021 Strategies and Successes

The Statewide Agricultural Calculated Incentives program assisted in the transition management of projects from other closing programs as part of the shift to the new third-party implementer model. The role of this program will be diminishing in the future as the portfolio makes room for the new program and any future third-party programs in this sector.

Agricultural Deemed Incentives Program (PGE21032)

The Agricultural Deemed Incentives program provides fixed rebates for high volume measures such as variable frequency drives (VFDs) for irrigation pumps or process fans. 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 33,000 agricultural customers through training events, mass media advertising, and the expertise of PG&E's dedicated agricultural local account representatives and call center representatives.

2021 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 maximizes the efficiency of program administration costs for this high-volume measure, while enabling a simpler customer experience.

Agricultural Energy Advisor Program (PGE21034)

The Agricultural Energy Advisor program provides customer education and encourages participation in EE, DR, self-generation programs and promotes awareness of GHG and water conservation activities. The program provides energy savings opportunities and continuous improvement over time. Aligning integrated improvement opportunities with customers' needs, the Energy Advisor Program increases program participation and adoption rates by helping customers to better understand EE benefits.

2021 Strategies and Successes

In 2021, Agricultural Energy advisor supported online self-service tools, such as Business Energy Checkup[31], for agricultural customers. Through Business Energy Checkup, customers receive rate analysis, check their bills, and receive tips and tricks for saving energy.

[31] https://www.pge.com/en_US/small-medium-business/save-energy-and-money/energy-savings-tools-and-tips/business-energy-savings-tool.page

Agricultural Third-party Programs

Third-party agricultural programs[32] offer 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.

Agricultural Energy Savings Action Plan (AESAP) Program (PGE_Ag_001)

Implementer: TRC

The Agricultural Energy Savings Action Plan (AESAP) Program supports PG&E's vision for the agricultural sector to maximize yield while reducing energy consumption. AESAP uses data, technical assistance, analytics, energy efficiency measures and marketing to reduce demand, increase operational efficiency, and broaden customer participation while leveraging the custom, deemed, and meter-based savings platforms. AESAP also promotes and leverages On-Bill financing (OBF) and other private financing options as a tool to off-set the barrier of capital to fund projects. Please see the Financing Programs chapter of this report to learn more about On-Bill Financing.

2021 Strategies and Successes

Following the preparation and public posting of the program's Implementation Plan in December 2020, the AESAP officially launched in January 2021. PG&E immediately created program and marketing materials and started to reach out to customers and PG&E Account Management team. After a year focused on closing out existing projects and programs, it was most important that customers became aware of this new program and its opportunities. PG&E was successful in doing so and was able to engage and/or develop projects with 207 customers and 262 trade pros, committing 19 projects and completing 138 projects in 2021.

[32] These programs were launched following the Commission-approved solicitations process and meet the third-party program definition as described in D.18-01-004.

Financing Programs

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

PG&E's OBF Program Continues Popularity

In 2021, PG&E maintained the success of the OBF program while making significant investments to improve processing time and scalability for the future.

Since launching, OBF has issued over $300 million in loans across the agricultural, commercial, institutional, industrial, and multifamily sectors.

Key Initiatives

On-Bill Financing Program
In 2021, On-Bill Financing (OBF) continued to be a popular program, with 551 loans issued for a total value of $69 million. OBF loans are primarily issued directly to the customer through industry trade professionals, though many PG&E contracted programs also incorporate OBF into their program offering.

COVID-19 Relief
In recognition of the COVID-19 pandemic's impact on customer financial well-being, PG&E sought and received Commission approval to offer six-month OBF loan repayment deferrals in April 2020. These loan repayment deferrals offered economic relief to PG&E customers with minimal ratepayer impact, with over 200 customers participating in the loan deferral offer in 2020. Due to the ongoing nature of the COVID-19 pandemic, PG&E sought and received Commission approval to extend the loan deferral offering to customers through December 2021.[33]

Streamlined Financing Solutions
In 2021, PG&E launched a streamlined OBF offering called Tier 1A, which granted select project measures a simplified review process. Measures with predictable savings methodologies and simplified inputs were selected to test this new pathway, removing barriers to participation for smaller projects by allowing for expedited project review. For these select measures, the energy savings estimates were confirmed through a workbook template, eliminating detailed and unnecessary engineering steps.

Strategies and Successes

Financing programs facilitate portfolio energy savings by enabling customers to pursue large, comprehensive efficiency retrofit projects that might not have been financially feasible otherwise. In 2021, the OBF program maintained a similar level of financing to the prior year, despite the impact of COVID-19 and the transition to OBF loans being issued primarily without incentives. PG&E has also continued collaboration with the statewide Investor-owned Utilities (IOUs) and the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) to develop financing pilots that will offer more flexible terms to a broader array of customers.

[33] PG&E Advice Letter 4397-G/6110-E.

Financing Programs

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.

2021 Strategies and Successes

In 2021, the OBF program issued more than $69 million in new loans to 551 customers. Following the Commission's approval to offer six-month OBF loan repayment deferrals, PG&E also granted temporary repayment deferrals to 67 customers in 2021.

In 2021, the OBF program recorded 12 loan defaults, bringing the total number of loan defaults since program launch to 33 (a .007% default rate, based on 5,073 loans issued since program launch).[34] The low default rate is due in large part to the impact of COVID-19 on PG&E customer businesses and PG&E's pausing of bill collections to support customers financially impacted by COVID-19. Once collection activities around customer accounts are reinstated, PG&E anticipates that loan defaults relating to customers that went into arrears in 2020, 2021, and 2022 will result in an increased default rate. A higher default rate is not expected to materially impact OBF program operations, with overall defaults under the program remaining low since inception.

Following the approval of PG&E's request to expand the OBF offering, the Commission required PG&E to provide additional reporting on the OBF program as part of the Energy Efficiency Annual Reports.[35] PG&E is required to report on "default rates, energy savings, status of efforts to replace incentives with loans, and the degree of free ridership, if any, associated with energy efficiency projects financed through the OBF program."[36] Energy Division, in collaboration with the PG&E Financing team, completed the evaluation of free ridership in the OBF program in August 2020, with study results highlighting minimal free ridership in the OBF program (Net-to-Gross = 0.94).[37] This is the most up-to-date NTG analysis of the OBF program as of May 2022.

Financing Pilot Programs

The IOUs have supported CAEATFA in the development of 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 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). The pilots include ratepayer-supported credit enhancements (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.

34 Most defaults occur after the year of loan initiation; loans that defaulted in 2021 were issued between 2014 and 2016. Therefore, loan default rates are calculated for the length of the OBF program's operation. These loan defaults are also separate from the loan deferral process as detailed in PG&E Advice Letter 4397-G/6110-E.

35 D.19-03-001, OP 4.

36 Ibid.

37 Evaluation of the On-Bill Financing - Alternative Pathway, PY2018-2019, *CADMUS,* (August 2020). The report is publicly available at http://www.calmac.org/publications/OBF-AP_PY18-19_Process_Evaluation_Final.pdf

Emerging Technologies Programs

Testing Innovative Solutions through the Emerging Technologies Program

PG&E's Emerging Technologies (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. ET 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 (ET) programs are designed to reduce time-to-market for introduction of EE technology solutions, with an overall goal of increasing the supply of, and market demand for, EE technology solutions, delivered through two core programs: Technology Assessment (TA) and Technology Introduction Support (TIS). The TA program identifies and assesses the performance of emerging EE technology solutions in all sectors that may be offered to customers. The TIS program 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.

ET uses numerous strategies, such as Lab Testing, Field Testing, and Demonstration Showcases, to achieve program objectives. ET also 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.

Throughout 2021, PG&E introduced several new ET projects as the Statewide ET Programs (ETP), led by SoCalGas and Southern California Edison, would not be considering new projects until 2022. PG&E continued to collaborate on local ET activities with the California IOUs and will continue to ramp down projects, as programs are scheduled to close out by the end of 2022. Any new activities developed in 2022 will be managed through the two new Statewide ETPs. Details on Statewide programs lead by other IOUs are available in the lead IOU's respective Annual Reports.

Emerging Technologies Programs

Technology Assessment (TA) Program

Through the TA Program, EE technology solutions that are either new to the market or underutilized for a given application are evaluated for performance claims and overall effectiveness, such as 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 ET, and have provided critical support to EE programs. ET assessments may utilize data and information from different sources to support assessment findings, including in-situ testing (customer or other field sites), laboratory testing, and/or workpaper studies. In addition to other findings and/or information, assessments typically generate some of the data necessary for EE deemed rebate subprograms to construct a workpaper estimating energy and demand savings over the lifetime of the measure. Technology

solutions that are designated as “not market ready” nonetheless assist technology providers to enhance their offerings for the EE marketplace.

Local TA projects will be ramping down and closed out by December 31, 2022. All new TA projects introduced in 2022 will be evaluated and managed under the two third-party implemented Statewide ETPs, led by SoCalGas and SCE.

Technology Introduction Support (TIS) Program

The TIS program supports the introduction of new technology solutions to the market through several activities. Scaled Field Placement (SFP) 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 technology assessment 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 Zero-net Energy (ZNE), Integrated Demand-side Management (IDSM), and other EE goals.

The overall aim of Demonstration and Showcase projects is to introduce technology solutions to stakeholders from a systems-level, and potentially integrated level, rather than an individual (widget-based) perspective using data gathering and customer feedback in a real-world environment. The demonstration showcase exposes the public, investors, entrepreneurs and technology professionals to the technology solution 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.

Local TIS projects will be closed out by December 31, 2022. All new TIS projects introduced in 2022 will be evaluated and managed under the two third party implemented Statewide ETPs, led by SoCalGas and SCE.

Key Initiatives

Below are descriptions of key projects and programs conducted by PG&E in 2021.

Central Valley Research Homes (CVRH) Project

The Central Valley Research Homes (CVRH) project is the product of multiple years of effort by leading energy efficiency researchers and represents a significant investment of funding from the California Energy Commission, California IOUs, and industry. Testing at three of the four houses has focused on the performance of VCHPs (alternatively called mini-split heat pumps) while the fourth house has been focused on air-to-water heat pump (AWHP) systems operating with various hydronic delivery options (fan coils and radiant ceiling panels), load-shifting strategies, and in three function operating mode with integrated domestic water heating.

In 2021, two of the VCHP homes began testing ducted split and packaged VCHP equipment performance to get a better sense of how different technology configurations work. The third home is looking at advanced low-GWP HVAC solutions by evaluating a Sanden HPWH (for space heating and hot water) that uses CO_2 as refrigerant and an indirect-direct evaporative cooling system that uses water as the working fluid. The fourth house continues to evaluate hydronic systems, now with variable capacity AWHPs coupled to central ducted hydronic fan coils and integrated thermal energy storage to evaluate the ability of the system to provide

space conditioning with little or no on-peak electrical demand. This effort focused on performance and finding thermal storage solutions with few market barriers that are more attractive to mainstream production home builders.

Reporting activities continued in 2021, with the completion of a comprehensive Best Practices guide for VCHP design, installation, and field commissioning. A report on using thermal energy storage with AWHPs and radiant ceilings to use little to no on-peak electricity was posted at the Emerging Technologies Coordinating Council website. Findings from CVRH AWHP research were used in a 2022 Codes and Standards Enhancement report to improve the recognition of the AWHPs within the Title 24 compliance software. This software modification is expected to be implemented in the first half of 2022.

XeroHome/Vistar Existing Home Energy Modeling
In 2021, PG&E collaborated with XeroHome™ / Vistar to conduct analysis of the residential building stock in San Louis Obispo. XeroHome is a building energy modeling (BEM)-based tool that is designed to identify decarbonization, energy efficiency, and distributed energy generation opportunities in existing homes and provide a platform to promote outreach and engagement with homeowners. The large-scale building stock analysis approach and homeowner outreach strategy offers the ability to help cities develop, plan, and deploy policy strategies to achieve carbon reduction goals described in Climate Action Plans, and motivate building owners to begin energy upgrades. The software platform can build individual home energy models, then scale to cities or regions, while engaging with homeowners to provide them customized retrofit recommendations, based on the home's conditions. This addresses two critical problems needed to scale residential energy efficiency and electrification retrofit programs.

PG&E is supporting a test of the XeroHome model in San Luis Obispo (SLO), in collaboration with city staff. The analysis to date in SLO, which includes five data sources, is being assessed to identify packages that may be cost effective for the homeowner and help the city progress towards GHG emissions reduction goals. Packages under consideration include those that would encourage electrification and combinations of rooftop solar, heat pumps and key cost-effective energy efficiency options like ceiling insulation, and weatherization. Modeling those options will help to understand if cost-effective packages can be recommended to benefit residents, which would inform city energy ordinance development, and what incentive programs would best benefit the area. In 2022, a web portal will be developed to provide homeowners the ability to evaluate energy savings potential with recommended packages. The customer-facing portal will further verify the model's assumptions. The PG&E test of the XeroHome model is expected to conclude in 2022.

New Buildings Institute Advanced Water Heating Initiative and Grid Optimal Support
Two of New Buildings Institute's keystone programs, supported in part by funding from PG&E in 2021, are the Advanced Water Heating Initiative and the GridOptimal Buildings Initiative.

The Advanced Water Heating Initiative (AWHI) is a collaborative, market transformation effort of over 50 organizations working to catalyze a transition to high-efficiency, grid-connected Heat Pump Water Heaters (HPWH). Transformation of this market, through production and adoption of HPWHs, will support climate goals and reduce operational costs for consumers, utilities, and grid operators.

With input from the Advanced Water Heating Initiative's 120-volt Working Group, monitoring & verification contractors, and manufacturers, NBI developed a field study to show the potential of this new class of water heaters to meet the retrofit market's needs. Low power 120-volt designs

can plug into existing residential wall receptacles without requiring panel upgrades and/or significant home rewiring, presenting a solution to replace existing gas-fired tank type water heaters. The field study will bring understanding of the emerging technology opportunities and gaps to support program design for successful market adoption and transformation of hot water heating in accordance with California decarbonization goals. The study is a collaboration amongst multiple IOUs, including PG&E and SCE, as well as SMUD and other supporters.

NBI's GridOptimal Buildings Initiative developed new metrics by which building features and operating characteristics that support more effective grid operation can be measured and quantified. As part of this program, PG&E co-funded Phase 3 of this initiative in 2021. This supports the least-cost decarbonization of the grid through better integration of both distributed energy resources (DER) and utility-scale wind and solar energy. By creating a standardized set of metrics that define a building's contribution to the relevant utility grid scale — the building's operational performance as a grid asset — many doors open. Utilities may incentivize grid-sensitive design. Government agencies may include the metric in their procurement requirements or in their climate policies. Designers and building owners can consider these impacts in a project in a sensible, straightforward approach. In December 2021, NBI delivered a dashboard and summary report which can be used to assess program designs to assure that grid management is appropriately valued when determining which measures to support.

PG&E Midstream HPWH Field Study
In 2021, PG&E initiated the Midstream HPWH Study and Field Test to conduct a market assessment and study strategies to engage midstream market actors to accelerate the adoption of connected HPWHs for load-shifting. This project serves the residential sector, single family and multi-family, and results could potentially benefit small commercial buildings.

The Project includes a technical assessment of the market status and available resources and working closely with key partners to identify barriers and develop solutions to test in the field. All HPWHs installed through the project have "smart" controls embedded within the equipment or connected to an external control device. All HPWHs in the study are expected to be connected and capable of shifting load in response to a daily load shifting signal. The project coordinated with WatterSaver as the entity responsible for sending this signal on behalf of PG&E.

The project seeks to achieve the following primary goals:

- Identify barriers and solutions for midstream market actors to increase adoption of HPWHs.
- Identify solutions to barriers that impede HPWH installation found during the WatterSaver beta test and during the duration of the project.
- Establish best practices for HPWH installation.
- Reveal the gaps not covered by California's Technology and Equipment for Clean Heating (TECH) and Building Initiative for Low Emissions Development (BUILD) to determine how PG&E can best compliment these programs.

Within the primary goal categories, there are several discrete project objectives:

- Identify changes to existing processes required to mitigate barriers to replacing gas water heaters with HPWHs in emergency and planned water heater replacements.
- Identify barriers and solutions specifically related to existing site conditions.
- Test different strategies to influence midstream market actors to adopt connected HPWHs.

- Educate distributors to increase knowledge of technologies/benefits and to encourage them to stock connected HPWH models.
- Collaborate with distributors to facilitate regional contractor trainings.
- Gather cost data, that may include but not limited to panel upgrades, ancillary equipment costs (e.g., bollards), and incremental labor costs.
- Determine installation costs to the customer and identify factors that influence customer decisions.
- Gather data on issues and barriers regarding the installation of thermal mixing valves.

Controlled Environment Horticulture (CEH)
Given the newness to regulation under Title 24 and the fact that some key segments of the CEH industry are in a state of rapid growth, notably cannabis production operations, finding existing and developing new raw data sources has been and will continue to be a key challenge for Codes and Standards (C&S) advocacy. There are significant savings opportunities that remain to be pursued through Title 24 “covered process” regulations. The large savings potential through future regulations and need for raw data collection efforts make CEH a priority topic for consideration by the PG&E ET programs so that subsequent C&S advocacy efforts are better positioned to succeed with capturing remaining CEH savings opportunities.

In 2021, PG&E’s research focus included 1) baseline information on equipment and current practices, 2) design and operations best practices, and 3) increased awareness of what types of regulations may be feasible given sensitivities of CEH operators to potential regulatory impacts on their crop production outcomes. In addition to energy and peak demand considerations, PG&E will look at demand flexibility opportunities as part of the research. Areas of interest within CEH include LED indoor lighting, dehumidification and HVAC equipment design, window performance and daylighting controls, irrigation and environmental controls, and circulation fan minimum performance specifications.

Frontier Energy Inc. Induction Cooktop Loaner Program
The Induction Cooktop Loaner Program is a collaborative effort between the PG&E C&S and Workforce Education and Training (WE&T) programs, the PG&E Tool Lending Library, and the PG&E Emerging Technologies programs. In 2021, the Induction Cooktop Loaner Program was set up and funding extended through 2022. Under the direction of PG&E and its contractor, the Induction Cooktop Loaner Program will support the Tool Lending Library (TLL) located at the San Ramon Valley Conference Center with day-to-day operations that support the logistics of including induction cooktops in the TLL.

The TLL works with PG&E customers to provide energy and building measurement tools including induction cooktops for energy efficiency, demand reduction, demand response, decarbonization, and electrification projects in California. One of the obstacles identified as a barrier to electrification is a strong customer preference for gas cooktops. The Induction Cooktop Loaner Program was developed to allow residential and commercial customers to try an induction cooktop without having to make a substantial investment in a technology they are uncertain of; this “try it before you buy it” approach will not only allow PG&E customers to try an induction cooktop, the program also provides technical support and will collect follow up surveys that will provide PG&E with more insight into the customer experience with these products.

Codes, Standards, and New Construction

PG&E's Codes and Standards (C&S) programs collaborate with regulatory bodies—such as the California Energy Commission (CEC or Energy Commission) and the U.S. Department of Energy (DOE—to strengthen or develop new Energy Efficiency (EE) and GHG emissions reducing regulations. C&S programs undertake efforts to increase compliance with regulations so that the State realizes the savings from C&S. The programs also support local governments that include adopting local energy ordinances as a climate strategy. PG&E conducts both planning and coordination to optimize collaboration as well as code readiness activities to address data gaps and needs for future C&S activities. Additionally, PG&E leads four recently launched statewide new construction programs, across the residential and non-residential sectors, supporting California's ambitious new construction goals.

C&S advocacy and compliance improvement activities extend to newly constructed or renovated buildings and appliances sold in California. In so doing, C&S efforts not only support California's ambitious climate and energy goals, but promote customer equity and social justice: by extending the successes of voluntary EE programs to all customers and by resolving market barriers such as split incentives..

California 2021 C&S Savings[38]

	Gross Savings			Net Standard Savings			Net Program Savings		
	GWh	MW	MMTherm	GWh	MW	MMTherm	GWh	MW	MMTherm
Statewide	12,930	2,160	81.4	6,539	1,192	62.1	3,628	619	43.0
All IOUs	10,301	1,721	92.8	5,209	949	67.9	2,891	493	46.1
PG&E	4,632	774	38.8	2,343	427	29.6	1,300	222	20.5
SCE	4,074	680	-	2,060	375	-	1,143	195	-
SoCalGas	-	-	48.1	-	-	33.8	-	-	22.5
SDG&E	1,595	267	5.9	807	147	4.5	448	76	3.1

Key Initiatives

PG&E's key initiatives for 2021 included:

- Continuing statewide administration of C&S advocacy programs and commencing statewide administration of nonresidential new construction programs;
- Advocacy for new or updated and adopted sections of California's 2022 Energy Code and related American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE) and the International Energy Conservation Code (IECC) activities;

[38] 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".

- Advocacy for new or updated sections of California's Title 20 Appliance Efficiency Regulations (Title 20) and DOE appliance standards, and related ENERGY STAR® activities;
- Training, tools, and resources to support compliance with California's existing EE regulations;
- Primary data collection to support DOE and CEC rulemakings, as well as inform CBECC-Res and CBECC-Com (CEC code compliance software);
- Development of new cost-effectiveness studies and other resources to support local government reach codes;
- Planning and coordination activities to guide implementation and optimize work across teams within PG&E and with other California utilities; and
- Code readiness activities aimed at specific industries and technologies for future code cycles;
- Launching the statewide nonresidential new construction (all-electric and mixed fuel) programs; and

Launching the statewide residential new construction (all-electric and mixed fuel) programs

Opportunities Moving Forward

Emerging issues of focus in the C&S and new construction sectors include grid harmonization; integration of EE with EVs, renewables, and energy storage in commercial buildings; flexible demand technologies; and affordable multifamily buildings. PG&E's C&S and new construction programs will continue to advocate for more efficient building codes and appliance standards; collect primary data to inform code and standard development; develop tools to support code compliance; support local governments that pursue reach codes; support efficient, all-electric and electric-ready new construction projects that can serve as a model for the architecture, engineering design, and builder communities.

Codes and Standards Programs

State Building Codes Advocacy: Title 24, Part 6 & Part 11 (PGE_SW_CSA_Bldg)

Statewide Program Lead: PG&E

The Statewide Building Codes Advocacy program supports the CEC's triennial update to the Energy Code (Title 24, Part 6) to include new EE regulations or to strengthen existing regulations for various technologies or measures. Advocacy activities include the development of Codes and Standards Enhancement (CASE) proposals, research to provide the data needed to advance EE regulations, and participation in the public rulemaking processes. The program also supports the Energy Commission in preparing recommendations to the Building Standards Commission to update the California Green Buildings Standards (Title 24, Part 11 or CALGreen). The voluntary energy measures in CALGreen provide foundational elements for local reach codes.

2021 Strategies and Successes

In 2021, the program supported the Energy Commission's 2022 rulemaking by completing 24 Codes and Standards Enhancement (CASE) Reports. With input from hundreds of individual stakeholders, the Statewide CASE Team developed 91 unique code change proposals, 66 of which were incorporated in the 2022 code. The Energy Commission has indicated another 12 proposals may be incorporated into the compliance software as new or revised features. A list of

measures, the final CASE Reports, and Results Reports which summarize the advocacy outcomes are available at Title24Stakeholders.com.

The Statewide CASE Team also published a voluntary requirements proposal for CALGreen (California Green Building Standards Code – Title 24, Part 11).[39] After the 2022 Energy Code was adopted, planning for the next code cycle began. Starting in Fall 2021, the Statewide CASE Team began soliciting input from a variety of stakeholders to begin gathering code change proposal ideas. At the end of 2021, over 350 measure ideas were collected and prepared for presentation to the Energy Commission to consider for the 2025 Energy Code rulemaking.

National Codes & Standards: DOE, ASHRAE 90.1 and 189.1, IECC, ENERGY STAR® (PGE_SW_CSA_Natl)

Statewide Program Lead: PG&E

PG&E advocates for national building codes and appliance standards that support California by encouraging broader market 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 DOE, Environmental Protection Agency (EPA), Federal Trade Commission, ASHRAE, and IECC code and standard update proceedings in support of increasing requirements is important to minimize gaps, when regionally appropriate, between the California's EE regulations and the EE regulations that other states adopt.

2021 Strategies and Successes

In 2021, PG&E collected data for high-impact rulemakings; incorporated data into IOU responses to DOE rulemaking opportunities; and collaborated with stakeholders, DOE, and their consultants. These collaborations supported advocacy for residential and commercial heating, ventilation and air conditioning units, DX dedicated outdoor air systems, residential refrigerators, residential clothes washers and dryers, commercial and industrial boilers, televisions, and motors. PG&E also completed test plans for variable frequency drives, air purifiers and packaged terminal air conditioners / room air conditioners and completed surveys of consumer usage of room and portable air conditioners and commercial refrigerant pipe installation practices.

Additionally, this program 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 80 rulemaking advocacy letters issued in 2021.[40] PG&E supported participation in ASHRAE and IECC committees and subcommittees, including supporting participation as a voting member of the Mechanical Subcommittee of ASHRAE SSPC 90.1 and, as of July 1, 2021, as a Voting Member of the full committee. PG&E also supports attendance of an implementer at meetings of the Lighting and Envelope Subcommittees of SSPC 90.1.

[39] https://title24stakeholders.com/measures/2022-calgreen/voluntary-energy-efficiency-requirements-for-title-24-part-11-calgreen/.

[40] Several of the advocacy letters were submitted on the same topic to respond to DOE's ongoing rulemakings.

PG&E supported participation in the development for source energy factors and carbon emission factors that mirrored efforts for the 2022 Energy Code development, including treating renewables as having no source energy and using the 20-year GWPs for short-lived climate pollutants such as methane. PG&E also supported leading the resiliency task group which developed a proposal for a timed override of outside air (either greater or less) to account for temporary conditions such as wildfires, pandemics etc., and played a key role in the rewrite of the daylighting and views requirements in a format that was more readily enforceable and more broadly incorporated IES-LM83 in the performance approach for glare.

PG&E supported two Voting Members of the IECC Residential Consensus Committee and the following IECC Residential Subcommittees: HVACR and Water Heating; Economics, Modeling, and Whole-building Metrics; and Commercial Subcommittees: HVACR, Water Heating, Lighting and Electrical Power (including EVs). PG&E also supported development of a cost effectiveness methodology and calculator for use by all participants in the assessment of residential code change proposals. The methodology and tool were approved by the relevant subcommittee. In addition, modeling support was provided to help analyze multiple proposed changes to the Energy Rating Index compliance path that could decrease the disparity between it and the other compliance paths for residential buildings.

State Appliance Standards Advocacy Program (PGE_SW_CSA_Appl)

Statewide Program Lead: PG&E

The Statewide Appliance Standards Advocacy (ASA) program targets improvements to Title 20 by the California Energy Commission. Advocacy activities include developing Title 20 code enhancement proposals, participating in the California Energy Commission public rulemaking process and conducting data collection to support future appliance standards. Additionally, the program monitors state and federal legislation and intervenes, as appropriate.

2021 Strategies and Successes

In 2021, ASA pursued several specific program efforts. ASA program staff participated in several Energy Commission webinars and workshops and advocacy for the Energy Commission rulemakings on a couple of products: 1) flexible demand appliance standards (FDAS), 2) tires and 3) low power mode. The IOUs supported the future adoption of FDAS, low power mode, and tires standards though advocacy, data analysis, and data collection.

Compliance Improvement Program (PGE21053)

The Compliance Improvement (CI) program aims to increase compliance with adopted Title 24, Part 6, Title 20 and federal EE regulations. CI serves market actors throughout the entire compliance chain, providing education, outreach, technical support, and resources to improve compliance with Title 24 (Part 6) building codes, and Title 20 and DOE appliance standards. CI program activities complement other C&S program work by maximizing persistent savings from C&S advocacy activities.

2021 Strategies and Successes

In 2021, The CI program continued to employ a three-pronged performance improvement approach to enact behavior change by providing 1) training to impart 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 responds directly to key CI market actor's unique workflow and job tasks and was completed in close collaboration with users and the Energy Commission.

Energy Code Ace delivered more than 159 training sessions to more than 3,200 students on top of providing a learning platform through which more than 300 people completed Online Self Study courses. The number of Energy Code Ace subscribers climbed to over 15,000 and the number of visits increased by 27 percent from the previous year. Overall, Energy Code Ace maintained an average 27 percent knowledge swing and 97 percent satisfaction rate. Additionally, PG&E realized more than 5,000 views on the Energy Code Ace YouTube channel. Analysis of website activity shows sharp increases in the number of Energy Code Ace Resource downloads when new codes and standards go into effect.

Compliance improvement subject matter experts also continued supporting CASE authors and the Title 24, Part 6 advocacy team with 2022 CASE work by sharing implementers' point of view. Subject matter experts reviewed more than 27 CASE Reports for clarity and enforceability; trained CASE authors on market actor roles; and worked with CASE authors to develop a new multifamily compliance manual chapter with project examples.

PG&E continued collaborating with strategic partners such as the American Institute of Architects (AIA) California, California Building Officials (CALBO), California Association of Building Energy Consultants (CABEC), BayREN, and 3C-REN to provide their members and customers with training and resources targeted specifically to their needs. Energy Code Ace also launched a new series of 30-90 minute live webinars, designed to bring critical Energy Code information to industry organization chapters. The initial suite of webinar topics support decarbonization and the move toward all-electric buildings.

Reach Codes Program (PGE21054)

In addition to state and national building codes advocacy, the C&S Reach Codes Program provides support to local governments that wish to adopt local energy ordinances ("reach codes") that exceed statewide Title 24 minimum requirements for new and existing buildings, additions, or alterations. The primary objective of the program is to facilitate the adoption process by filling resource or expertise gaps at the jurisdiction through:

- Conducting research and analyses to establish performance levels and cost effectiveness relative to fundamental Title 24, Part 6 (Energy) and Part 11 (CALGreen) requirements by climate zone
- Drafting model ordinance language to encourage consistency and minimize duplication
- Assistance completing and expediting the application process required for approval by the California Energy Commission
- Providing customized implementation support to improve compliance with the requirements once effective

2021 Strategies and Successes

Reach code adoption momentum remained strong in 2021 with 15 jurisdictions adopting a reach code and an additional five receiving CEC approval, bringing the total to 57 jurisdictions with reach codes in the current code cycle. 41 of the 57 jurisdictions adopted ordinances that amended the energy code and received Energy Commission approval. Nearly all the ordinances targeted new construction, with five containing specific requirements for existing buildings. Although most ordinances included exceptions for certain occupancies or technologies, between 2019 and 2021, a trend developed moving toward reducing the number and scope of the exceptions and disallowing gas in all new construction.

Throughout the year, work to support jurisdictions pursuing reach codes included analysis and report development, technical support, reach code resource accessibility improvements, and other activities. Reach Codes Program activities fell into two main categories:

- Direct technical support: including both general support and customized support for individual jurisdictions. Materials include cost-effectiveness studies, model language, checklists and other implementation resources, and the Cost-effectiveness Explorer Tool. In 2021, the Reach Codes Program completed six new cost-effectiveness studies on building and construction types, as well as several custom analyses that jurisdictions relied on during their adoption processes; added several new materials to it suite of support resources; and continued developing its Cost-effectiveness Explorer Tool.
- Education and Communications: in 2021, this included maintaining and the program's LocalEnergyCodes.com website, where the site's searchable map consistently garnered hundreds of views per month throughout the year, and its Reach Codes Path page was viewed over 30,000 times. It also included preparing a monthly newsletter for over 400 subscribers, which published five articles on "frontrunner" cities that are leading the way.

Planning and Coordination Program (PGE21055)

The planning element of this program includes long-term planning and scenario analyses, modeling of impacts from potential C&S program activities relative to California policy goals and voluntary programs, development of business and implementation plans, 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, including voluntary and workforce education and training EE programs; other PG&E program areas; and grid management.

Since codes and standards impact the entire state and almost all building types, occupancy categories, and related technologies, external harmonization activities encompass: 1) CPUC, Energy Commission, and California Air Resources Board (CARB), 2) other IOUs, municipal utilities, and utilities in other states, 3) national advocates such as the Appliance Standards Awareness Project, Natural Resources Defense Council, Northwest Energy Efficiency Alliance, Sierra Club, American Council for an Energy-Efficient Economy, National Consumer Law Center, Consumer Federation of America, 4) representatives of various manufacturing companies and industry groups such as the Association of Home Appliance Manufacturers, Consumer Technology Association, NEMA, Air-Conditioning, Heating and Refrigeration Institute, American Gas Association, and 5) water utilities and local governments, and 6) other parts of the compliance improvement supply chain: building inspectors, Title 24 consultants, Contractor State Licensing Board, and others.

2021 Strategies and Successes

In 2021, at the request of CARB and the CPUC's Energy Division, the California Statewide Codes and Standards program members provided data to inform CARB's proposals related to electric vehicle charging infrastructure requirements in CALGreen (Title 24, Part 11). Coordinating with IOU clean energy transportation colleagues, the team shared cost models, reach code summaries, and supporting information related to EV charging infrastructure codes for non-residential and multifamily buildings. The team finalized and submitted two reports, one focused on light-duty EV charging infrastructure[41] and one focused on medium- and heavy-duty

[41] https://title24stakeholders.com/measures/2022-calgreen/light-duty-ev-charging-infrastructure-cost-analysis/

EV charging infrastructure.[42] The California Building Standards Commission adopted new and updated codes in December 2021 and they become effective on January 1, 2023.[43]

Pursuant to greater integration between C&S and new construction program activities, the Planning and Coordination program supported development of statewide new construction programs which include the data collection infrastructure to support future advocacy. This includes measure-level data required for codes and standards proposals and identification of sites for in-depth metering of advance technologies.

Code Readiness Program (PGE21056)

The primary purpose of the Code Readiness program is to accelerate achievement of state policy goals related to energy efficiency, decarbonization, and grid harmonization through data acquisition and industry outreach. Technologies and disruptive systems are tested and demonstrated with the aim of collecting high-quality information and data needed to support improvement to C&S; specifically, test procedure representativeness, as well as measure cost-effectiveness, feasibility, and compliance efficacy.

2021 Strategies and Successes

Retail Appliance Accelerator (RAA)

The RAA is the mechanism for PG&E's participation the National ENERGY STAR Retail Products Platform. The RAA program provides advocacy support by promoting the adoption of higher-efficiency appliances through inducements to retailers for qualifying energy efficient appliance sales, as well as providing data to support advocacy and positive engagement with manufacturers. RAA now supports test procedure development on several appliance categories while also providing sales data for the following:

- Residential Clothes Dryers (RAA sales data and test procedure development)
- Residential Refrigeration (RAA sales data and test procedure development)
- Residential Room Air Conditioning (RAA sales data)
- Residential Clothes Washers (RAA sales data and test procedure development)
- Residential Dishwashers (RAA sales data)
- Residential Induction Cooktops (RAA sales data and test procedure development)
- Residential Room Air Cleaners (RAA sales data)
- Residential Televisions (RAA sales data and test procedure development)

Non-Residential Field Research

Non-Residential field research activities continued in 2021, with the completion of five field assessment projects while recruitment efforts continued for the second wave of project sites for additional field monitoring assessment of existing DOAS and VRF installations. The following are notable successes:

- The data and draft report from a Code Readiness DOAS Field Assessment project in the City of Davis were leveraged to provide support to the CASE 2022 Nonresidential HVAC Controls report. The preliminary site information was helpful to demonstrate how this technology is being built and operated and how energy codes could enhance basic efficiency requirements.
- Code Readiness DOAS Field Assessment data was used by Federal standards advocacy efforts for DX-DOAS products. Select sites with these products had

[42] https://title24stakeholders.com/measures/2022-calgreen/medium-and-heavy-duty-ev-charging-infrastructure-cost-analysis/

[43] https://www.dgs.ca.gov/BSC/Rulemaking/2021-Triennial-Code-Adoption-Cycle/Dec-2021-Commission-Mtg

valuable operational information able to help the California IOU team develop their advocacy report.

- Code Readiness DOAS Field Assessment sites were able to be used by Federal Standards advocacy team looking to monitoring VRF in more depth and provided clients who were willing to participate in a more advanced effort. This overall saved on time and effort in finding technology installations.
- Code Readiness DOAS Field Assessment sites with VRF monitoring helped the staff at NEEP who are developing a cold climate VRF research plan to understand lessons learned on building monitoring and data gathering best practices with these types of systems.
- Research teams at New Buildings Institute codes and standards teams are interested in understanding how DOAS code enhancements to inform larger US code advocacy for low energy buildings and were able to use the Draft CASE 2022 report which built on Code Readiness DOAS efforts.
- Code Readiness DOAS Field Assessment site data helped to identify Energy-Savings and Performance Improvement Controls Opportunities at client sites:
    - Oakland – Code Readiness Team's observation of a decrease in exhaust fan power through our submeter trends led to the identification of loose belt on exhaust fan resulting in airflow not meeting design requirements.
- Martinez – Code Readiness Team's trend observations alerted Martinez site that VRF system was operating unintentionally during unoccupied hours and increasing energy usage unintentionally, which was resolved.
- PG&E completed its roof-top unit (RTU) economizer research and field study in 2021. Nearly 30 locations were tested with the intention of improving code baseline assumptions. Portable Battery testing to determine product performance and develop a test procedure. This work supports building code efforts to include batteries in residential buildings.

Multifamily Research Projects

In 2021, the Code Readiness program continued with a multifamily new construction research project where the application of heat pump water heaters (HPWH) in a central water heating configuration will assess the performance of certain grid-interactive HPWH control strategies. The Code Readiness program also continued work on the Creekside, Multifamily Air Infiltration, Multifamily Domestic Hot Water Draw Schedule, and Multifamily Air Sealing studies.

Appliance Standards Research Projects

In 2021, the Code Readiness program also conducted appliance research on refrigerators, DX-DOAS HVAC systems, TVs, air purifiers, portable ACs/room ACs, induction cooktops, battery systems, laundry appliances, Wi-Fi-enabled appliances, and low-power mode appliances. Projects typically included a combination of designing and conducting lab testing in partnership with manufacturers, customer metering and surveys to determine impacts, reviews of prior research, test plan development, and data analysis to support appliance standards progress.

New Construction Programs

Following the successful completion of statewide third-party program solicitations that began in 2019, PG&E launched four statewide new construction programs in 2021. The goal of these new construction programs is to influence the new construction market to achieve deeper energy savings and decarbonize new buildings through key activities such as outreach and education, real-time energy modeling, verification, and data tracking to inform future codes and standards. PG&E now leads four statewide new construction programs across the residential and non-residential sectors, which focus on both all-electric and mixed-fuel building projects.

California Energy-Smart Homes All Electric Residential Program (PGE_SW_NC_Res_electric)

Statewide Program Lead: PG&E
Implementer: TRC

The California Energy-Smart Homes All-Electric Residential Program (CESH-AE) supports a high-level approach to achieving California's advanced EE policy goals through 2025 by engaging with builders and developers to recruit potential projects and convince them to build all-electric. The program is available to customers in the PG&E, SCE, and SDG&E territories. The all-electric program offering serves five residential sub-sectors: Single family and duplexes, multifamily low-rise (three or fewer stories), manufactured housing, accessory dwelling units, and addition/alteration (additions greater than 700 square feet). The program influences the decision and ease the transition to adopt all-electric new construction practices by educating potential participants and stakeholders on the features of all-electric homes, enrolling projects, emphasizing the installation of advanced energy efficiency measures, and facilitating future opportunities through non-incentivized, prerequisite measures that position homes to install high-impact demand response technologies more easily in the future.

2021 Strategies and Successes

Following Commission approval of the CESH-AE Program in August 2021, the program began launch preparation that included the preparation of the project enrollment form, program participation agreement, data plan, marketing plan, program policies and procedures plan, program training overview, launching the program website and the writing of the Implementation Plan, which was filed in October 2021.

California Energy-Smart Homes Mixed-Fuel Residential Program (PGE_SW_NC_Res_mixed)

Statewide Program Lead: PG&E
Implementer: TRC

The California Energy-Smart Homes Mixed-Fuel Residential Program (CESH-MF) supports a high-level approach to achieving California's advanced energy efficiency policy goals through 2025 by engaging with builders and developers to recruit potential new construction projects that are unable to make the switch to all-electric, and alteration projects that are only able to partially convert to all-electric. The program is available to customers in the PG&E, SCE, SoCalGas, and SDG&E territories. The mixed-fuel program offering serves three residential subsectors: Single family and duplex, multifamily low-rise (three or fewer stories), and alterations.

The program influences the decision and eases the transition to adopt advanced energy measures and facilitates future opportunities through non-incentivized, pre-requisite measures that position homes to transition to all-electric and install demand response technologies more easily in the future. To accomplish this, the program educates potential participants and

stakeholders on the features of mixed-fuel and electric-ready homes, enrolls projects, emphasizes the installation of advanced energy efficiency measures, and facilitates future opportunities through non-incentivized, prerequisite measures that position homes to install electric equipment and appliances, as well as high-impact demand response technologies more easily in the future.

2021 Strategies and Successes

Following Commission approval of the CESH-MF Program in September 2021, the program began launch preparation that included the preparation of the project enrollment form, program participation agreement, data plan, marketing plan, program policies and procedures plan, program training overview, launching the program website and the writing of the Implementation Plan, which was filed in November 2021.

California Energy Design Assistance All-Electric (CEDAE) Program (PGE_SW_NC_NonRes_Com_electric)

Statewide Program Lead: PG&E

Implementer: Willdan Energy Solutions

The CEDAE program serves commercial, public, high-rise multifamily residential, industrial, and agricultural new construction sectors, and major alterations facilities across the PG&E, SCE, and SDG&E territories. This program contributes to the IOUs' efforts to achieve their share of California's ambitious energy efficiency (EE), greenhouse gas reduction, and Zero Net Energy (ZNE) goals by offering EE options tailored to each building during the design and construction process. CEDAE also offers technical assistance early in the process when it has the greatest influence on design and operation, driving energy savings beyond code and gather data to further advance future codes. The CEDAE program enrolls and influences the non-residential new construction market to achieve deeper energy savings and decarbonize through key activities such as outreach and education, real-time energy modeling, verification, and data tracking to inform future codes and standards.

2021 Strategies and Successes

Following Commission approval of the CEDAE Program in April 2021, the program began launch preparation that included the preparation of the project enrollment form, program participation agreement, data plan, marketing plan, program policies and procedures plan, program training overview, launching the program website, and the writing of the Implementation Plan, which was filed in June 2021. The program was launched on August 1, 2021, and is rapidly ramping up customer enrollments.

California Energy Design Assistance Mixed Fuel (CEDAM) Program (PGE_SW_NC_NonRes_Com_mixed)

Statewide Program Lead: PG&E

Implementer: Willdan Energy Solutions

The CEDAM program serves commercial, public, high-rise multifamily, industrial, and agricultural new construction sectors, and major alterations facilities across the PG&E, SCE, SoCalGas, and SDG&E territories. CEDAM contributes to the IOUs' efforts to achieve their share of California's ambitious energy efficiency (EE), greenhouse gas reduction, and Zero Net Energy (ZNE) goals by offering technical assistance early in the process when it has the greatest influence on design and operation, driving energy savings beyond code and gathers data to further advance future codes. The CEDAM program will enroll and influence the non-residential new construction market to achieve deeper energy savings and decarbonize through key activities such as outreach and education, real-time energy modeling, verification, and data tracking to inform future codes and standards.

2021 Strategies and Successes

Following Commission approval of the CEDAM Program in April 2021, the program began launch preparation that included the preparation of the project enrollment form, program participation agreement, data plan, marketing plan, program policies and procedures plan, program training overview, launching the program website, the writing of the Implementation Plan, which was filed in June 2021. The program was launched on August 1, 2021, and is rapidly ramping up customer enrollments.

Workforce Education & Training

PG&E's Workforce Education and Training (WE&T) Program provides people who design, build, operate, and maintain buildings and building systems the relevant skills needed to eliminate unnecessary energy use. WE&T teaches members of the current and future energy workforce the best practices to save energy in support of PG&E's and the California's energy efficiency and carbon-reduction goals.

PG&E continued to demonstrate leadership in the local, state, and national EE workforce arenas in 2021. While administering the WE&T programs—Integrated Energy Education & Training (IEET) and Connections—locally and launching the Statewide WE&T programs—Career & Workforce Readiness and Career Connections—PG&E collaborated with and provided technical advice to local workforce development organizations, educational institutions, professional organizations, 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

Building Electrification

As dozens of California municipalities instituted new or continued existing local electrification and decarbonization ordinances in 2021, the topics of electrification and decarbonization became increasingly important and relevant to the WE&T audience. PG&E developed, updated, and delivered over 95 webinars on electrification and decarbonization on topics including heat pump water heaters, induction cooking, heat pump space conditioning, battery storage, and grid integration. In 2022, with input from other internal stakeholders, WE&T will continue to offer such classes and develop new ones to address the rapidly changing landscape and the customers' need for information on how to decarbonize buildings and cities. A list of current electrification classes is available at www.pge.com/energyclasses.

Supporting the Energy Savings Assistance (ESA) Program

PG&E continued to support the Energy Savings Assistance (ESA) Program by offering a blended learning experience comprised of on-demand, webinar, and in-person training for the Energy Specialist, Weatherization Specialist, and Natural Gas Appliance Testing technician roles. PG&E continued to deliver training safely through webinars, thus optimizing the time and travel costs associated with ESA contractor training. In 2021, PG&E provided support to design a new Train-the-Trainer model with the ESA Program training team. The drivers for this new model include increasing flexibility of training schedules for contractors, streamlining training processes, expanding on webinar to on-demand and blended training delivery during COVID-19, and reducing training cost to benefit rate payers.

Expanding Program Reach through Collaborations

For several decades, PG&E has collaborated with professional, trade, and workforce development organizations that share common workforce goals, including safety, energy

efficiency, and a highly skilled energy workforce. In 2021, PG&E collaborated with various organizations to reach additional and new members of the energy workforce. Eleven of those collaborations resulted in formal Statements of Collaborations in support of PG&E's WE&T Business Plan metrics. Those formal collaborations included,

- Participating in a statewide IOU collaboration with Stanford University's Center for Professional Development to enhance the Energy Innovation and Emerging Technologies certificate program and making it more accessible to energy professionals in California;
- Providing instruction and energy efficiency training modules for San Francisco's Stationary Engineers Local 39 to incorporate into their training program;
- Reviewing, expanding, and updating the energy efficiency content of the Illuminating Engineering Society's (IES) Intermediate Quality Energy Efficient Lighting Course;
- Upskilling un- and under-employed workers to complete an 8-day Building Operator Certification course and providing career support services;
- Supporting faculty and staff at five higher educational institutions with training resources for energy efficiency training and energy projects support;
- Supporting students at higher educational institutions with energy efficiency training, internships, fellowships, and sustainability outreach campaigns;
- Joining all four California IOUs to sponsor/support the 2021-2022 Architecture at Zero design competition, which promotes decarbonization, equity and resilience, open to students and professionals.
- Teaching advanced equipment and food preparation techniques—featuring high-performance and energy efficient equipment—to San Francisco Bay Area school foodservice and nutrition staff;
- Expanding and introducing energy efficiency content into the Center for Employment Training's training programs for the HVAC, Electrical, Construction/Carpentry, and Culinary sectors;
- Providing training resources for the U.S. Army's Construction Engineering Research Laboratory (CERL) Academy and for PG&E's Existing Buildings Commissioning (EBCx) Workshop series.

In 2022, PG&E will continue some of the successful collaborations and seek new opportunities to collaborate with other organizations with a goal of at least 8 collaborations, including new and on-going collaborations.

Strategies and Successes

2021 saw the continuation of the COVID-19 pandemic, requiring flexibility and adaptability to serve PG&E's customers. PG&E responded to customers' rapidly evolving needs and to a dynamic and diverse set of carbon reduction goals across PG&E's territory. PG&E addressed these challenges by expanding training over the Internet and by developing classes to address rapidly changing technologies, specifically building electrification. WE&T continued to deliver educational programs, technical advice, and energy measurement

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.

WE&T programs continued to refine and enhance marketing efforts with an increased emphasis on multiple marketing channels including email promotions, quarterly newsletters, partner organizations, social media advertising, and two new marketing campaigns—disadvantaged worker and workforce development boards. In addition, WE&T provided posters and postcards at HVAC parts houses to promote HVAC trainings. Each month, Welcome Emails were sent to familiarize new users with available resources provided by WE&T. WE&T class catalog links were added to relevant PG&E program pages. Marketing efforts contributed to approximately 15 percent increase in total class attendance from 2020.

The WE&T organization leveraged training development and delivery expertise (Training-as-a-Service) in select projects benefitting the PG&E program workforce, and customers. These projects are separate from Integrated Energy Education and Training (IEET) which is focused on PG&E customers that design, build, maintain, and operate buildings and building systems. In 2021, WE&T programs completed three projects benefitting the PG&E Energy Efficiency programs. This includes updating training for project developers utilizing On Bill Financing, updating training for project developers, program managers and technical reviewers highlighting key concepts in the PG&E Resource Savings Rulebook, and a new intermediate level training for Non-IOU Participants on energy efficiency cost effectiveness. These trainings are available to the general public as of 2021.

Responding to the increasing percentage of students who chose to attend events online and propelled by suspension of in-person training during COVID, PG&E decided to close the Pacific Energy Center in early 2021, after 30 years in San Francisco, and WE&T focused on reaching even more customers through online classes. During 2021, PG&E continued with COVID-modified protocols, to offer no-cost Tool Lending Library from new facilities within the San Ramon Valley Conference Center that are dedicated to the WE&T.

In 2021, PG&E also increased the focus on collaboration with organizations that reach disadvantaged workers and initiated targeted marketing efforts to reach these students. Examples of these initiatives included paid social media advertising as well as dedicated email campaigns to energy professionals living in high unemployment ZIP codes that are in the top 25 percent of the CalEnviroScreen Tool unemployment indicator.

To support customer interest in electrification and fuel substitution in the food service sector, PG&E also expanded the Induction Cooking Program in 2021. For residential customers, commercial food service customers, and for the design community, PG&E developed and delivered residential and induction cooking classes, a subset of which were recorded and made available as on-demand classes. As a pilot to offer classes in non-English languages, PG&E

translated a class on commercial induction woks into Mandarin and made it available on-demand. Although COVID restrictions on indoor gatherings prevented the delivery of in-person induction cooking demos for commercial food service customers, PG&E prepared equipment and resources to begin offering demos once COVID guidelines permitted.

Furthermore, in collaboration with the PG&E Emerging Technologies program, PG&E launched the Induction Cooktop Loaner Program (ICLP), which gives residential customers, commercial food service customers, and other customers the opportunity to try an induction cooktop at their homes and businesses. Through the ICLP, customers will have two weeks to try a countertop induction cooktop and provide PG&E their impressions of induction cooking before and after the two-week loaner period.

Opportunities Moving Forward

Recognizing that some skills require in-person training for hands-on learning, 2022 presents an opportunity for PG&E to strategically plan the return to select in-person training during late 2022 or 2023. By 2023, PG&E hopes to safely resume select in-person training at the San Ramon Valley Conference Center in San Ramon, the Energy Training Center in Stockton, and local training partners across PG&E's territory. PG&E will continue to rely primarily on webinars and on-demand training to expand reach and minimize the need for student travel but will leverage hybrid learning as in-person training resumes. This training model will incorporate webinars and on-demand training to reduce the amount of in-person training to the extent possible. PG&E also recognizes that there are opportunities to increase the participation of disadvantaged workers in available trainings.

WE&T Programs

In 2021, PG&E implemented two local WE&T programs—Integrated Energy Education & Training (IEET) and Connections. IEET's audience includes the incumbent energy efficiency workforce as well as people enrolled in a credentialed education program and soon to enter the workforce. The Connections audience consists of K-12 students, K-12 teachers, and organizations training future generations of the energy workforce. As lead IOU, PG&E launched two Statewide Third-Party programs—Career and Workforce Readiness (CWR) and Career Connections. CWR supports and trains disadvantaged workers to enter the energy workforce and places program participants into jobs where they can use the skills they acquired. Career Connections supports K-12 teachers, K-12 students, and organizations training future generations of the energy workforce to encourage and lead K-12 students into the energy workforce.


Integrated Energy Education & Training (IEET, PGE21071)

The Integrated Energy Education & Training (IEET) program serves the incumbent energy efficiency workforce—people who design, build, maintain, or operate buildings and building systems—across several market segments, including agriculture, foodservice, commercial, industrial, and residential. While in-person activities were restricted in 2021 due to COVID protocols, IEET typically provides in-person and web-based education and training programs, technical advice, outreach events, and energy measurement tool loans.

2021 WE&T Accomplishments

Metric / Deliverable	Quantity
Formal Collaborations with other organizations*	11
Total Class Attendance*	23,001
Class participants as a percent of eligible target population*	3.6%
Percent of participants meeting the definition of Disadvantaged Worker*[44]	46.6%
Number of Classes	685
Tool Lending Library (TLL) Transactions**	127
Tool Lending Library Tools Loaned **	1449
Tool Lending Library Projects Supported **	106

*Formal WE&T Business Plan Metric
**To comply with COVID-19 safety and health guidelines, the TLL temporarily suspended tool loans to the public in mid-March 2020

2021 Strategies and Successes

In 2021, while operations were still modified to meet COVID guidance, PG&E focused on delivering high-quality and industry-relevant classes and tool loans that prepare California's building industry to meet the state's energy and climate goals. PG&E undertook continuous improvement initiatives to improve training outcomes and student records processes, expand our reach and to decrease the average cost per student.

[44] D.18-10-008 defines a disadvantaged worker as "an individual that meets at least one of the following criteria: lives in a household where total income is below 50 percent of Area Median Income; is a recipient of public assistance; lacks a high school diploma or GED; has previous history of incarceration lasting one year or more following a conviction under the criminal justice system; is a custodial single parent; is chronically unemployed; has been aged out or emancipated from the foster care system; has limited English proficiency; or lives in a high unemployment ZIP code that is in the top 25 percent of only the unemployment indicator of the CalEnviroScreen Tool."

PG&E also explored new ways to make training easier for customers by leveraging an online learning management system (LMS) capable of facilitating account registration, course enrollment and learning activity tracking for three primary modalities: live in-person events, live online webinars, and self-paced online coursework. Improvements included leveraging on-demand and prerequisites for hybrid learning, streamlining the registration process, and developing dashboards for improved visualization of feedback from student surveys.

In 2021, the four IOU WE&T teams continued to share on-line resources as a way of improving cost efficiency. Building on the 2019 and 2020 piloting of shared simulcasts, the IOUs continued to cross-promote online classes. In addition to collaborating between IOUs, the PG&E WE&T programs also collaborated with TECH, 3C-REN, Marin Clean Energy and BayREN under Joint Cooperation Memos (JCMs). The intent of the JCMs is to share existing training resources, to increase attendance, and to avoid duplicative efforts in developing new training.

The Energize Colleges and Climate Corps programs partnered with higher education institutions to help provide energy efficiency and IDSM education and, career experiences, by supporting faculty curriculum activities and student projects.

In 2021, Energize Colleges partnered with San Jose City College faculty to support the development of several curriculum efforts, including a new non-credit course that introduces students to energy systems, renewable energy, energy efficiency, and associated employment opportunities. Additional faculty efforts supported included the development of curriculum required to pass the Electrician Trainee and Journeyman exams administered by the state of California.

Additionally, Energize Colleges and Climate Corps partnered with San Jose City College, Fresno State, UC Hastings, CSU Sacramento, as well as state agencies (CalRecycle and Department of Transportation), and Oakland Unified School District, to support fellowship and internship training and projects. Fellowship and internship projects focused on a range of topics, including energy efficiency, conservation, sustainability, climate action planning, transportation, recycling, renewables, and water-energy nexus.

Connections (PGE21072)

Prior to the launch of the Statewide Third-party Career Connections program, the Connections programs developed, inspired, and trained future generations of the energy workforce. Connections provided 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, green career awareness, and skills building experiences. Connections also informed students about career and education pathways in the energy sector and provided students with career exploration opportunities. PG&E sunset Connections programs in July 2021 and K-12 sector work was replaced with the Statewide Career Connections third-party “Energy is Everything” program. Connections post-secondary sector activities continued as part of the Integrated Energy Education & Training (IEET) WE&T program.

2021 Strategies and Successes

2021 Connections programs increased participation and implemented enhanced distance learning resources and partnership activities. These efforts addressed the changing needs of educators and families transitioning between various learning modes—in-person, hybrid, and virtual—and made it easier to continue to use educational resources after the program sunset. PEAK Student Energy Actions (PEAK) continued to teach K-8 students how to manage energy use at their homes and schools and inspire students to pursue green careers. In 2021, PEAK focused on meeting the changing needs of educators and families through engagement with partners to identify needs and strengthening program offerings for use at home. Additional PEAK@Home resource modifications make it easier for students and families to implement curriculum at home without additional teacher support and resources.

Energize Schools continued to provide teacher training and prepared high school students for energy careers and higher education programs through project-based sustainability curriculum and student-led action projects

In 2021, Energize Schools provided additional teacher training support and enhanced hands-on activity alternatives. For example, enhanced instructional guides, presentation slides, and student handouts that teachers can easily integrate into their virtual, in-person, or hybrid classrooms were incorporated into the SketchUp curriculum within the Ecological Economics and Climate Policy distance learning resources. Additionally, Energize Schools provided individual virtual classroom support, such as mock interviews with sustainability professionals for students at San Francisco's Green Academy.

Connections Program	Grades Served	Total # of Students	Total # of Schools	% Title 1 of > 40% FRPM[45]
PEAK	K-8	4,179	25	68%
Energize Schools	9-12	15,993	41	71%
Total		20,172	66	70%

Statewide WE&T Programs

In support of WE&T Business Plan goals and strategies, PG&E released two RFAs and subsequent RFPs in 2020, covering two Statewide Third-Party WE&T solicitations—Career Connections (CC) and Career & Workforce Readiness (CWR). The RFPs were completed in early 2021, advice letters for both programs were filed in May 2021, the programs launched with the approval of their respective advice letters in June 2021, public meetings announcing the programs were held in August 2021, and implementation plans were also filed in August 2021.

[45] Connections serves Title 1 schools or schools where more than 40% of its students are on the Free & Reduced Meal Pricing (FRPM) plan. The definition for FRPM includes students who are directly certified for meals at no cost, on the basis of their participation in CalFresh, CalWORKs, the Food Distribution Program on Indian Reservations, and Medi-Cal free, and the extension of these benefits go to students within the same household. Also included are students certified as homeless, migrant, foster, runaway, or participating in the Head Start program.

Career Connections: Energy is Everything (PGE_SW_WET_CC)

Implementer: The Energy Coalition (TEC)

The Statewide Career Connections third-party "Energy is Everything" (EisE) program helps to build the next generation of energy workers. EisE provides Kindergarten through Twelfth grade students the knowledge, skills, and abilities they need for college and career opportunities in the energy industry and motivates students to adopt pro-environmental behaviors. EisE incorporates career concepts for all learners, since early exposure to career options increases the chances of students pursuing and securing high-demand energy and STEM careers. Education providers targeted will primarily focus on those classified as "disadvantaged".

2021 Strategies and Successes

Through most of Q3 2021, PG&E supported program ramp-up and launch activities, such as securing approval for marketing materials, program website, curriculum, and establishing a communications cadence. In 2021, EisE established 20 partnerships, including non-profit STEM educators, county offices of education, and a postsecondary institution. EisE also facilitated its first educator training in December 2021, which reached 39 energy educators, and held a workshop on engineering wind turbines that reached one hundred high school students.

Career and Workforce Readiness: Energize Careers (PGE_SW_WET_Work)

Implementer: Strategic Energy Innovations (SEI)

Energize Careers aims to create a diverse and representational energy workforce through the economic empowerment of people who experience personal or systemic barriers to employment. Energize Careers assists program participants access technical training and living wage energy career opportunities. Energize Careers provides holistic services to support disadvantaged workers through technical training, job placement, and wrap-around service support. Energize Careers collaborates with pre-apprenticeship programs, apprenticeship programs, community-based training organizations, and community colleges to provide technical energy job training to disadvantaged workers. Energize Careers also collaborates with wrap-around service providers and industry partners to provide people with services and support to access career pathways into living wage jobs where they can leverage their energy efficiency knowledge and skills.

2021 Strategies and Successes

In May 2021, PG&E filed an Advice Letter[46] seeking CPUC approval to launch the Energize Careers program. Through most of Q3 2021, PG&E focused on program ramp-up and launch activities, such as securing approval for marketing materials and program website, developing program reporting templates, establishing communications cadence. In 2021, Energize Careers contracted with six training partners across the IOUs' territories, and trained and employed the first set of program participants. Collectively, the Rising Sun Center for Opportunity and the San Diego Electrical Training Institute trained 40 disadvantaged workers. Rising Sun placed 13 program participants into jobs where they could use the knowledge and skills they acquired during their training.

[46] PG&E Advice 4442-G/6207-E.

Tables and Appendices

Section 1
Energy Savings

Table 1
2021 Net First Year Savings, Goal Attainment and Fuel Sub Load Reduction Adjustments

	GWh	MW	MMTherms	GWh	MW	MMTherms
	Portfolio - Non C&S			Codes & Standards		
2021 Total Installed Portfolio Savings (1)	333.7	59.3	19.9	1,511.8	257.2	23.4
Adopted Goals (D.19-08-034)	358	73	14	642	136	13
Percentage of goal attainment (4)	93%	81%	143%	235%	189%	180%
Fuel Substitution Goal Reduction see Tab 2, Table 2B			0.07			
Goals less FS Goal Reduction (7-9 not reflected in CEDARS unless requested)	358	73	13.93	642	136	13

Notes:
(1) All energy savings numbers are net with 5% market spillover. Energy savings are based on the actual accomplishments recorded in 2021.

(2) Installed savings for PG&E includes Bay Area Regional Energy Network (BayREN) as reported in their 2021 Annual Claims filed on May 2, 2022, Marin Clean Energy (MCE) as reported in their 2021 Annual Claims filed on May 8, 2022, Tri-County Regional Energy Network (3C-REN) as reported in their 2021 Annual Claims filed on May 4, 2022, and Redwood Coast Energy Authority (RCEA) as reported in their 2021 Annual Claims filed on May 3, 2022

(3) CPUC Adopted Goals and installed savings excludes Energy Savings Assistance (ESA) Program.

(4) Percentage of goal attainment is calculated using adjusted goals for fuel substitution.
(5) Energy Savings may not exactly match with the results in CEDARS due to rounding.

Section 2
Fuel Substitution Savings

Table 2

All fuel substitution savings data can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-2 Fuel Sub". The spreadsheet can be accessed on the CPUC's California Energy Data and Reporting System (CEDARS) website at https://cedars.sound-data.com/documents/standalone/list/.

Section 3
Environmental Impacts

Table 3

All environmental impacts data, listed by measure use category, can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-3 EnvImpacts". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 4
Expenditures

Table 4

All 2021 expenditures data can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-4 Expenses". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 5
EE Programs

Table 5

All EE programs and associated budget, expenditures, cost-effectiveness, and savings data can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-5 Programs". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 6
Cost-Effectiveness

Table 6

Cost Effectiveness (Net)

Annual Results	Total Cost ($) to Ratepayers (TRC) (3)	Total Savings ($) to Ratepayers (TRC/PAC)	Net Benefits ($) to Ratepayers (TRC) (3)			
Total Portfolio w/o C&S	$277,501,358	$204,390,683	$(73,110,675)			
TOTAL Portfolio with C&S	$780,314,102	$2,306,319,357	$1,526,005,254			
Annual Results	**TRC Ratio (4)**	**Total PAC Cost (3)**	**PAC Ratio (4)**	**PAC Cost ($/kW) (1)**	**PAC Cost ($/kWh) (2)**	**PAC Cost ($/therm) (2)**
Total Portfolio w/o C&S	0.74	$137,450,589	1.49		0.36	1.15
TOTAL Portfolio with C&S	2.96	$167,880,742	13.74		0.08	0.63

(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. PAC Cost is split between electric and gas based on the Total Portfolio (with C&S) electric and gas split respectively.
(3) The cost-effectiveness calculations are based on the actual accomplishments recorded in 2021.
Excludes: installed savings for Energy Savings Assistance (ESA) Program; BayREN, MCE, 3C-REN, RCEA, and ESA Program costs and benefits; Statewide Emerging Technologies Program costs per D.12-11-015 (p.52); Financing Program OBF Loan Pool amounts (loans issued and repaid) of $33M for 2021 are excluded per D.09-09-047 (p.288).
(4) All savings values include 5% market spillover in cost-effectiveness calculations per D.12-11-015 (OP 37) including Codes and Standards.
(5) Cost Effectiveness results may not exactly match with the results in CEDARS due to rounding.

Section 7
Bill Impacts

Table 7

Average Billpayer Impacts from Net Savings

2021	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	$0.2336	$1.8590	$511,550,564	$6,384,161,535

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 12/1/21) with first year net kWh energy savings.
(2) Average first year gas bill savings is calculated by multiplying an average gas rate (as of 12/31/21) with first year net therm energy savings.
Gas rate reflects the annual average residential bundled rate for 2021.
(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 BayREN, MCE, 3C-REN, and RCEA savings; excludes ESA Program.

Section 8
Savings by End Use

Table 8
Annual Savings By Use Category 2021 (1) (2) (3)

			Gross GWh		Gross MW	Gross MM Therms		Net GWh		Net MW	Net MM Therms	
Measure End Use Category	TRC	PAC	First Year	Life Cycle	First Year	First Year	Life Cycle	First Year	Life Cycle	First Year	First Year	Life Cycle
Appliance or Plug Load	1.92	21.71	111.6	892.0	18.7	0.7	10.8	111.3	890.5	18.7	0.1	8.3
Building Envelope	2.04	182.18	27.7	540.0	13.7	2.9	57.6	27.6	537.6	13.4	2.8	56.5
Compressed Air	2.03	15.51	3.1	39.3	0.1	-	-	2.8	38.4	0.0	-	-
Commercial Refrigeration	3.96	17.45	79.1	749.9	10.5	0.1	0.2	77.8	739.7	10.3	0.1	-0.1
Codes & Standards	3.61	150.53	82.4	1,300.7	12.4	-0.0	-0.0	82.4	1,300.7	12.4	-0.0	-0.0
Food Service	0.84	0.98	1.8	15.8	0.3	0.6	7.6	1.5	12.4	0.2	0.4	5.0
HVAC	2.04	10.54	125.8	1,646.1	48.6	6.2	85.8	115.8	1,537.8	46.2	5.7	78.7
Irrigation	0.41	0.59	4.4	34.0	2.4	-	-	2.8	22.1	1.5	-	-
Lighting	7.73	70.17	1,037.4	15,617.4	117.2	-2.1	-26.7	1,034.3	15,591.8	116.8	-2.1	-26.6
Non-Savings Measure	-	-	-	-	-	-	-	-	-	-	-	-
Process Distribution	1.10	1.76	8.6	91.3	0.6	0.1	0.5	4.2	37.3	0.2	0.1	0.6
Process Drying	-	-	-	-	-	-	-	-	-	-	-	-
Process Heat	3.27	9.50	0.7	9.5	0.0	26.5	398.2	0.5	6.1	0.0	5.1	75.8
Process Refrigeration	0.44	0.61	2.6	17.9	0.2	-	-	1.7	11.7	0.2	-	-
Recreation	3.34	38.01	16.4	169.8	3.5	0.3	1.6	16.4	169.6	3.5	0.2	1.1
Service	0.75	0.99	10.1	30.3	0.8	0.4	1.2	6.9	20.6	0.6	0.3	0.9
Service and Domestic Hot Water	3.37	25.88	16.9	164.2	2.1	15.9	163.2	16.7	162.0	2.1	14.4	151.7
Whole Building	1.25	7.55	337.1	2,340.7	88.3	16.0	139.6	342.8	2,343.0	90.2	16.2	139.8
TOTAL	**2.96**	**13.74**	**1,866**	**23,659**	**319**	**68**	**840**	**1,846**	**23,421**	**316**	**43**	**491**

Notes:
(1) All net energy savings numbers include 5% market spillover.
(2) Includes savings for Bay Area Regional Energy Network (BayREN) as reported in their May 17, 2022 email to PG&E, Marin Clean Energy (MCE) as reported in their May 11, 2022 email to PG&E, Tri-County Regional Energy Network (3C-REN) as reported in their May 9, 2022 email to PG&E, and Redwood Coast Energy Authority (RCEA) as reported in their May 13, 2022 email to PG&E.
(3) Cost effectiveness results:
Excludes Energy Savings Assistance (ESA) Program, BayREN, MCE, 3C-REN, and RCEA benefits and costs.
Excludes Statewide Emerging Technologies Program costs per D.12-11-015 (p.52)
(4) Codes and Standards savings are assigned to a more specific use category where possible.
(5) ESA Program savings are excluded.

Section 9
Commitments

Table 9
Commitments [(1)(3)]

Commitments Made in the Past Year with Expected Implementation after December 2021				
	Committed Funds (2)	Expected Energy Savings		
2021	$	GWH	MW	MMth
Resource	$14,715,387.71	37.47	4.47	4.08
Non-Resource	$ -	-	-	-
Codes & Standards	$ -	-	-	-
PG&E Total	**$14,715,387.71**	**37.47**	**4.47**	**4.08**

Notes:
(1) All energy savings numbers are on a net basis.
(2) Committed Funds for 2021 include incentives related to PG&E EE projects committed in prior year(s) but not yet completed as of December 2021.
(3) Additional tables covering commitments with expected implementation after program years 2010-2012, 2013-2015, 2016, 2017, 2018, 2019, and 2020 can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-9 Commitments". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 10
Shareholder Incentives

All Efficiency Savings and Performance Incentive (ESPI) data can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-10 ESPI". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 11
Cap and Target Expenditures

The 2021 Energy Efficiency Cap and Target Expenditure Report can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-11 Cap & Target". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 12
Metrics

All metrics data can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-12 BP Metrics". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 13
Third-Party and Statewide Calculations

Reporting on Local Program Third-Party Budgets, Statewide Programs Third-Party Budgets, Assembly Bill 841 Budget, Annual Budgets, Third-Party Outsourcing Compliance, and Statewide Budget Compliance can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-13 3P Calculation". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Section 14
PG&E's Marketplace Metrics

On December 21, 2017, as directed in ordering paragraph (OP) 1c of Resolution E-4820, PG&E proposed to the Energy Division a format and schedule for reporting the targets for Energy Management Technology (EMT) related activities. PG&E proposed metrics for the Marketplace program that focus on the relevant sections of the platform for Assembly Bill 793 (AB 793) and EMTs. These are standard marketing industry accepted website metrics.

All Marketplace reporting data can be found in the "PGE.AnnualExcel.2021.1.xlsx" spreadsheet, under Tab "T-14(PG&E) Marketplace Metrics". The spreadsheet can be accessed on the CPUC's CEDARS website at https://cedars.sound-data.com/documents/standalone/list/.

Appendix A

PG&E Program ID Numbers

Program ID	Program Name
PGE_Ag_001	Agriculture Energy Savings Action Plan (AESAP)
PGE_Com_001	CoolSave; Grocery Comprehensive Retrofit & Commissioning (GCRx)
PGE_Com_002	Smart Labs
PGE_Com_003	NetOne
PGE_Com_004	Advanced Energy Program for High Tech & Biotech
PGE_Com_005	Healthcare Energy Fitness Initiative
PGE_Ind_001a	Industrial Strategic Energy Management - Food Processing
PGE_Ind_001b	Industrial Strategic Energy Management - Manufacturing
PGE_Ind_002	Business Energy Performance (BEP) Program
PGE_Ind_003	Industrial Systems Optimization Program (ISOP)
PGE_Pub_001	Central Coast Leaders in Energy Action Program (CC-LEAP)
PGE_Pub_002	Marin Energy Watch Partnership
PGE_Pub_003	Redwood Coast Energy Watch
PGE_Pub_004	Central California Energy Watch (CCEW)
PGE_Pub_005	San Mateo County Energy Watch Program
PGE_Pub_006	Energy Access SF
PGE_Pub_007	Sierra Nevada Energy Watch (SNEW)
PGE_Pub_008	Sonoma Public Energy
PGE_Pub_009	Government & K-12 Comprehensive Program
PGE_Pub_010	RAPIDS Wastewater Treatment Optimization Program
PGE_Res_001a	Pay for Performance - Comfortable Home Rebates
PGE_Res_001b	Pay for Performance - Home Intel
PGE_Res_001c	Pay for Performance - Home Energy Rewards
PGE_Res_001d	Pay for Performance - Home Energy Optimization
PGE_Res_002a	Home Energy Check-up
PGE_Res_002b	Marketplace
PGE_Res_002c	Home Energy Reports
PGE_Res_002d	Continuous Energy Feedback Program
PGE_Res_003	Multifamily Energy Savings Program (MESP)
PGE_SW_CSA_Appl	State Appliance Standards Advocacy
PGE_SW_CSA_Bldg	State Building Codes Advocacy
PGE_SW_CSA_Natl	National Codes & Standards Advocacy
PGE_SW_ETP_Gas	Emerging Technologies Program, Gas
PGE_SW_IP_Gov	Institutional Partnerships: DGS and DoC
PGE_SW_NC_NonRes_Com_electric	California Energy Design Assistance All-Electric (CEDAE) Program
PGE_SW_NC_NonRes_Com_mixed	California Energy Design Assistance Mixed Fuel (CEDAM) Program
PGE_SW_NC_Res_electric	California Energy-Smart Homes All Electric Residential Program
PGE_SW_NC_Res_mixed	California Energy-Smart Homes Mixed-Fuel Residential Program

Program ID	Program Name
PGE21072	Connections
PGE_SW_WET_CC	Career Connections ("Energy is Everything")
PGE21002	Residential Energy Efficiency (PLA)
PGE21005	Residential New Construction and Advanced Energy Rebuild
PGE21007	California New Homes Multifamily
PGE21011	Commercial Calculated Incentives
PGE21012	Commercial Deemed Incentives
PGE21014	Commercial Energy Advisor
PGE210143	Hospitality Program
PGE21021	Industrial Calculated Incentives
PGE210210	Industrial Recommissioning Program
PGE210212	Compressed Air and Vacuum Optimization Program
PGE21022	Industrial Deemed Incentives
PGE21024	Industrial Energy Advisor
PGE21027	Heavy Industry Energy Efficiency Program
PGE21031	Agricultural Calculated Incentives
PGE21032	Agricultural Deemed Incentives
PGE21034	Agricultural Energy Advisor
PGE21036	Industrial Refrigeration Performance Plus
PGE21053	Compliance Improvement
PGE21054	Reach Codes
PGE21055	Planning and Coordination
PGE21056	Code Readiness
PGE21061	Technology Development Support
PGE21062	Technology Assessments
PGE21063	Technology Introduction Support
PGE_SW_WET_Work	Career & Workforce Readiness ("Energize Careers")
PGE21071	Integrated Energy Education and Training
PGE21091	On-Bill Financing (excludes Loan Pool)
PGE210911	On-Bill Financing Alternative Pathway
PGE21091LP	Financing Loan Pool Addition
PGE21092	Third-Party Financing
PGE21093	New Financing Offerings
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)
PGE211025	Savings by Design (SBD)

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 several 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., Database for Energy Efficiency Resources (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 to 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 issued 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 Energy Efficiency 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 to 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 Senate Bill (SB) 350 (2015) and Assembly Bill (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.

D. 19-08-009: *Decision Modifying the Energy Efficiency Three-prong Test Related to Fuel Substitution,* was issued on August 5, 2019*,* modified and clarified the formulation of the three-prong test. On August 23, 2019, the Commission issued D.19-08-034: *Decision Adopting Energy Efficiency Goals for 2020 – 2030*, adopted energy savings goals for ratepayer-funded energy efficiency program portfolios for 2020 to 2030. D. 19-12-021: *Decision Regarding Frameworks for Energy Efficiency Regional Energy Networks and Market Transformation*, issued on December 12, 2019 adopted frameworks for two areas of energy efficiency policy: regional energy networks (RENs) and market transformation initiatives (MTIs).

On March 20, 2019, under A. 08-07-021, the Commission issued D. 19-03-001: *Decision Granting Petition for Modification of Decision 09-09-047 Concerning On-bill Financing,* granted PG&E petition for modification and allowed PG&E to expand its on-bill financing program. On November 11, 2020, the Commission issued D. 20-11-013: *Decision Imposing Moratorium on*

Efficiency Savings and Performance Incentive Program, which imposes a moratorium on award payments under the ESPI mechanism beginning with 2021 program year advice letter earnings claims to remain in effect pending subsequent Commission.

On February 11, 2021, the Commission issued Resolution E-5115, addressing issues related to evidence requirements for the determination of energy consumption baselines for energy efficiency programs pursuant to D.16-08-019 and Resolution E-4818, with the proposed outcome of adopting minimum evidence *requirements* guidance to support custom projects accelerated replacement measure type. This Resolution did not increase costs beyond the energy efficiency budgets adopted in D.18-05-041.

On February 11, 2021, the Commission issued Resolution E-5108 (Rev 1) approving, with adjustments, Efficiency Savings and Performance Incentive awards for three major California IOUs for program years 2018 and 2019, and delayed the recovery of the incentives until 2022. This Resolution approved $15,299,119 in incentives for PG&E.

D.21-01-004 provided directions to the large investor-owned utilities (IOU) for funding the School Energy Efficiency Stimulus Program, established by Assembly Bill 841 (Stats. 2020, Chap. 372) and under administration of the California Energy Commission (CEC).

D.21-05-031 adopted a new metric, total system benefit, for the identification of energy efficiency potential and setting goals; adopted a new approach to segmenting energy efficiency portfolios according to a program's primary purpose (resource acquisition, market support, or equity); and addressed changes to the rolling portfolio framework and regulatory processes proposed by stakeholders in the context of the California Energy Efficiency Coordinating Committee (CAEECC).

On June 24, 2021, Resolution E-5150: Adopted Updates to the Avoided Cost Calculator for Use in Demand-Side Distributed Energy Resource Cost-Effectiveness Analyses.

On August 5, 2021, Resolution E-5152: gave Approval of the Database for Energy-Efficiency Resources Updates for Program Year 2023 and Revised Version for Program Years 2022 and 2021.

D.21-09-037 adopted energy efficiency goals for 2022-2032.

D.21-12-011 authorized new programs to enhance Summer 2022 and 2023 electric reliability.

On December 23, 2021, the Assigned Commissioner and Administrative Law Judges issued an Amended Scoping Ruling, in which it outlined the following basic schedule for 2022-2023:

Topic/Event	Date
Resolution of Order to Show Cause phases involving SoCalGas	1st and 2nd Quarters of 2022
Remaining lighting enforcement issues	Second Quarter of 2022
Issues associated with new portfolio applications	Second half of 2022
Rules associated with CCAs who elect to administer energy efficiency programs and RENs	Second half of 2022

Topic/Event	Date
Ongoing issues associated with implementation of market transformation policy, third-party solicitations, summer reliability programs, etc.	Throughout 2022 and 2023
Other issues	Ongoing/as needed

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 (IDER) 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 normalized metered energy consumption (NMEC) and/or dynamic baselines; and Industry Standard Practice determinations.

2018-25 Business Plan Application

Application (A.)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.

On August 9, 2019, the Commission issued D.19-08-006: *Decision Adopting Standard Contract for Energy Efficiency Local Government Partnerships*, which adopted a standard contract for energy efficiency local government implementers, and associated implementation details.

On December 20, 2019, PG&E's 2020 Annual Budget Advice Letter was rejected via nonstandard disposition and PG&E was instructed to file a revised Business Plan Application by September 1, 2020. On July 3, 2020, an *Amended Scoping Ruling Addressing the Impacts of COVID-19* was issued, postponing the deadline for PG&E's revised Business Plan Application to September 1, 2021. On December 21, 2020, PG&E's 2021 Annual Budget Advice Letter was rejected via nonstandard disposition. PG&E was required to hold a workshop to explain the portfolio's failure to meet cost-effectiveness requirements, how funding determinations were made for different programs, the methodology for establishing portfolio cost-effectiveness estimates, and why PG&E did not choose to provide additional funding to programs with high

TRC. PG&E was also asked to provide updates on portfolio performance to date as impacted by COVID-19, and an update on the third-party solicitation process. The workshop was held on March 16, 2021.

Advice Letters

PG&E filed the following advice letters related to EE in 2021.

1) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Local Multi-Sector Request for Proposal ("RFP") Advanced Energy program, executed between Nexant and PG&E, filed January 13, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4362-G/6055-E.pdf
2) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Local Multi-Sector Request for Proposal ("RFP") Healthcare Energy Fitness Initiative program, executed between Nexant and PG&E, filed January 13, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4363-G/6056-E.pdf
3) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Local Multi-Sector Request for Proposal ("RFP") NetOne program, executed between Ecology Action and PG&E, filed January 13, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4364-G/6057-E.pdf
4) Advice Letter Summarizing Establishment of Balancing Accounts to Record Funding Amounts Allocated to the School Energy Efficiency Stimulus Program in Compliance with Decision 21-01-004, filed February 1, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4375-G/6071-E.pdf
5) Advice Letter Summarizing PG&E's 2021 Energy Efficiency Budget Recovery Request for San Francisco Bay Area Regional Energy Network, Tri-County Regional Energy Network, and Marin Clean Energy in Alignment with PG&E's 2021 Energy Efficiency Annual Budget Advice Letter, filed February 1, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4376-G/6074-E.pdf
6) Joint Tier 1 Advice Letter to Fund the School Energy Efficiency Stimulus Program in Compliance with Decision 21-01-004, filed February 1, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4374-G/6070-E.pdf
7) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide New Construction Request for Proposal ("RFP") Non-Residential, All Electric - California New Construction program, executed between Willdan Energy Solutions and PG&E, filed February 19, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4387-G/6095-E.pdf
8) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide New Construction Request for Proposal ("RFP") Non-Residential, Mixed Fuel - California New Construction program, executed between Willdan Energy Solutions and PG&E, filed February 19, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4386-G/6094-E.pdf
9) Modifications to the Pacific Gas and Electric Company's On-Bill Financing (OBF) Loan Program Pursuant to D.19-03-001, filed March 5, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4397-G/6110-E.pdf

10) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Local Multi-Sector Request for Proposal ("RFP"), Continuous Energy Feedback Program (CEFP) program, executed between Oracle America Inc. and PG&E, filed March 29, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4410-G/6136-E.pdf
11) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide Workforce Education and Training Career and Workforce Readiness Request for Proposal ("RFP") Energize Careers program, executed between Strategic Energy Innovations and PG&E, filed May 28, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4442-G/6207-E.pdf
12) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide Workforce Education and Training Career Connections Request for Proposal ("RFP") Energy is Everything program, executed between The Energy Coalition and PG&E, filed May 28, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4443-G/6208-E.pdf
13) 2022 Joint Cooperation Memorandum (JCM) of 3C-REN, SoCalGas, SCE, and PG&E Pursuant to Decision (D.) 18-05-041, filed June 15, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4552-G/6225-E.pdf
14) PG&E and MCE's 2022 Joint Cooperation Memo in Compliance with Decision 18-05-041, Ordering Paragraph 38, filed June 15, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4450-G/6223-E.pdf
15) BayREN and PG&E's Joint Cooperation Memo in Compliance with D.18-05-041, Ordering Paragraph 38 for Program Year 2022, filed June 15, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4551-G/6224-E.pdf
16) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide State of California Request for Proposal ("RFP") program, executed between Alternative Energy Systems Consulting, Inc and PG&E, filed June 24, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4456-G/6236-E.pdf
17) PG&E's Annual Advanced Energy Rebuild Advice Letter in Compliance with Commission Disposition, filed June 30, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4460-G/6239-E.pdf
18) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide New Construction Request for Proposal ("RFP") - California Energy-Smart Homes All Electric Residential Program, executed between TRC Solutions, Inc. and PG&E, filed July 12, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4465-G/6254-E.pdf
19) Advice Letter Submittal of Pacific Gas and Electric Company's Third-Party Solicitations resulting from its Statewide New Construction Request for Proposal ("RFP") - California Energy-Smart Homes Mixed Fuel Residential Program, executed between TRC Solutions, Inc. and PG&E, filed July 12, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4466-G/6255-E.pdf
20) PG&E's 2022-2023 Energy Efficiency Biennial Budget Advice Letter in Compliance with Decisions 15-10-028, 18-05-041, and 21-05-031, filed November 8, 2021.

https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4521-G/6385-E.pdf

21) Supplemental Advice Letter of Pacific Gas and Electric Company's Third-Party Statewide Codes and Standards Federal Appliance Standards Advocacy Contract Change Order executed between 2050 Partners, Inc. and PG&E, filed November 19, 2021. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4484-G-A/6310-E-A.pdf