



REPORT ON ENERGY EFFICIENCY PORTFOLIO IN COMPLIANCE WITH PUC SECTION 913.5

REPORT TO GOVERNOR AND LEGISLATURE, 2017-2019 RESULTS

JULY 2021



**California Public
Utilities Commission**

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Executive Summary

This report complies with Section 913.5 of the Public Utilities Code by addressing the progress in electricity and natural gas energy efficiency (EE) programs for the years 2017-2019. Section 1 identifies electricity and natural gas efficiency savings based on the established efficiency goals set by the California Public Utilities Commission (CPUC), as well as associated program expenditures. In total, the 2017-2019 EE program portfolio saved 2,341 gigawatt-hours of electricity, 458 megawatts of demand, and 79 million therms of natural gas, exclusive of energy savings attributed codes and standards advocacy savings. According to [US EPA's Greenhouse Gas Equivalencies Calculator](#), the CO2 emissions from 2,341 gigawatt-hours of electricity savings equates to the annual electricity use of roughly 300 thousand homes. Section 2 outlines relevant CPUC decisions and studies related to EE programs.

Introduction

Scope of this report

This report complies with Section 913.5 of California’s Public Utilities Code, which states:

The CPUC shall submit a report to the Legislature by July 15, 2009, and triennially thereafter, on the EE and conservation programs it oversees. The report shall include information regarding authorized utility budgets and expenditures and projected and actual energy savings over the program cycle.

Goals and Overview of 2017-2019 Portfolio Activities

This report summarizes the accomplishments of the CPUC’s 2017-2019 EE programs based on evaluation studies conducted during and after the three-year cycle. Dozens of studies measured and verified the electricity and gas savings across a sample of the 400 programs implemented during the 2017-2019 period. It is important to note that part of the 2019 EE program year was not evaluated in time for this report and the numbers for that year are proxy values based on 2018 results and not the final evaluated results. Numbers from 2020 are not provided as these programs are still being evaluated.

The CPUC provides direction and oversight of the EE programs, while program administrators (PAs) implement and administer the programs. The PAs covered in this report include the following Investor-Owned Utilities (IOUs): Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SCG), and San Diego Gas Electric Company (SDG&E). Other California PAs like Community Choice Aggregators (CCAs) and Regional Energy Networks (RENs) are not included in this report as they make up a small percentage of statewide spending and savings.

The report is organized into two sections. Section 1 identifies electricity and natural gas efficiency expenditures and savings based on the established efficiency goals set by the CPUC. Section 2 outlines relevant CPUC decisions and studies related to EE.

A Note on the Numbers

This report focuses on energy savings goals and progress for IOUs under the residential, commercial, industrial, and agricultural sectors. Savings figures throughout the report are exclusive of energy savings achieved through advocacy efforts for new building codes and appliance standards, except where explicitly stated.

Our analysis of energy savings often compares data *reported* from the program administrators with data *evaluated* and verified by the CPUC. Reported energy savings are provided immediately after the close of the program year. However, evaluated savings are not available until evaluation studies are completed on the reported savings. Evaluated savings may differ from reported savings due to several factors, including the

EE measure being installed improperly, the use of incorrect hours of operation, or the use of incorrect baseline assumptions for the reported values.

The discussion of energy savings at the portfolio level considers both *net* savings and *gross* savings. Some program incentives are provided to customers who would have adopted the EE equipment or practice even without a utility program or rebate. Gross savings estimate represents energy savings regardless of program influence, whereas net savings estimates determine what savings occurred as a result of the EE program's existence.

Additionally, we state whether figures are *first year* savings or *lifecycle* savings. First year savings are the savings that EE equipment accrues in the first year after installation, which has historically been the metric upon which the CPUC has set portfolio goals. Lifecycle savings accrue over the entire useful lifetime of the equipment that was installed.

Section 1 – Energy Efficiency Goals, Savings & Expenditures

Investor-Owned Utility 2017-2019 Energy Savings Goals vs. Evaluated Savings

The CPUC’s electric and gas efficiency savings goals for each IOU are displayed in Table 1 below for 2017, and the aggregate of 2018 and 2019. The CPUC shifted the efficiency savings goals from a “gross” figure to a “net” figure beginning in 2018, so we show 2017 goal figures separately. The overall 2018-2019 portfolio net savings goals were 1,989 GWh for electric and 82 million therms for natural gas usage. Total IOU program portfolio evaluated net savings in the 2018-2019 period measured nearly 1,500 GWh for electric and 65 million therms for gas usage.

Table 1: IOU 2017-2019 Energy Efficiency Portfolio First Year Savings Compared to Goals

	2017 <u>Gross</u> Savings			2018 + 2019 <u>Net</u> Savings		
	Electric (GWh)	Demand (MW)	Natural Gas (MMTherms)	Electric (GWh)	Demand (MW)	Natural Gas (MMTherms)
Program Goals^{1,2}	1,516	236	34	1,989	392	82
Evaluated Savings	1,113	229	21	1,499	283	65

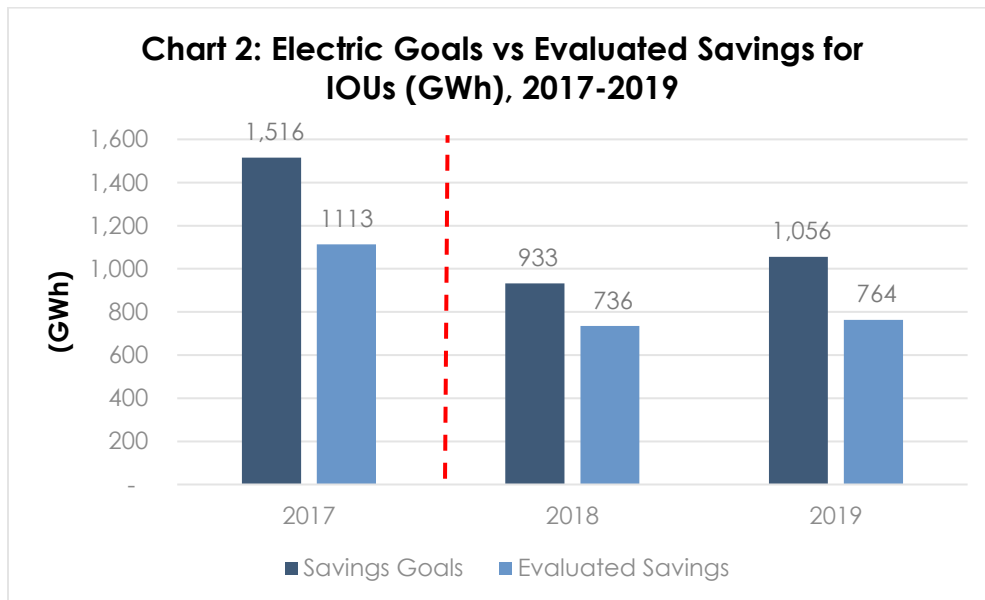
Note:

¹2017 figures are from D.15-10-028, pp. 8-9

²2018 & 2019 figures are from D.17-09-025, pp. 37-39

Evaluated electricity savings totals for the four IOUs were short of the goal target in each year, which equated to a 403 GWh (-26.6 percent) gap in 2017, 197 GWh in 2018 (-21.2 percent) and 292 GWh in 2019 (-27.7 percent). The gap between goals and evaluated savings in 2017-2019 was heavily influenced by

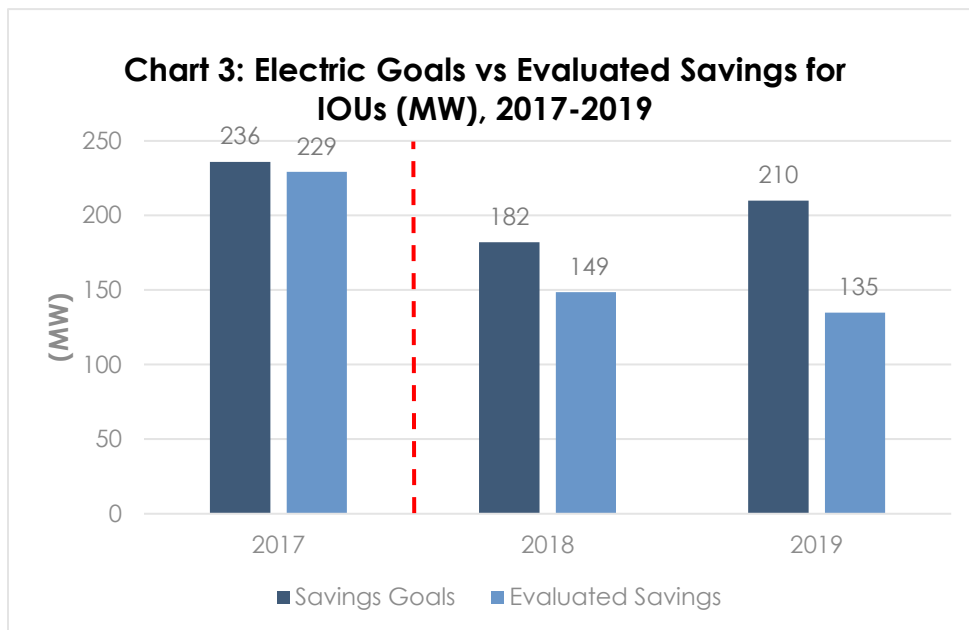
negative adjustments evaluators made to the primary lighting programs for SCE and SDG&E, which was primarily due to unaccounted for lamp shipments to small grocery and discount stores.¹



Note:
 Exclusive of IOUs' statewide codes and standards program
 2017 figures are gross savings (left of dotted line)
 2018 and 2019 figures are net savings

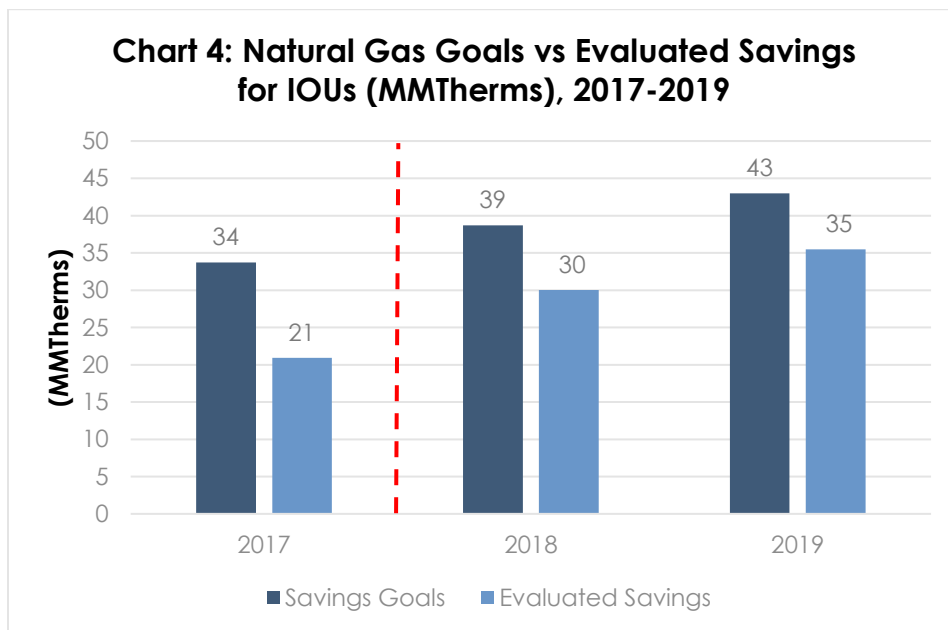
Electric demand (MW) did not meet the goal by about 3 percent (7 MW) in 2017 and 18.4 percent (33 MW) in 2018. In 2019 the EE portfolio missed the goal by about 36 percent (75 MW). As stated previously, evaluated savings were heavily influenced by lower than anticipated savings for the primary lighting program.

¹ Details stemming from program year 2017 can be found in the January 9, 2020, Administrative Law Judge Ruling: <https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=323767228>



Note:
 Exclusive of IOUs' statewide codes and standards program
 2017 figures are gross savings (left of dotted line)
 2018 and 2019 figures are net savings

Natural gas evaluated savings also missed their goals by 37.9 percent in 2017 (13 MMTherms), 22.4 percent (9 MMTherms) in 2018 and 17.5 percent (8 MMTherms) in 2019.



Note:

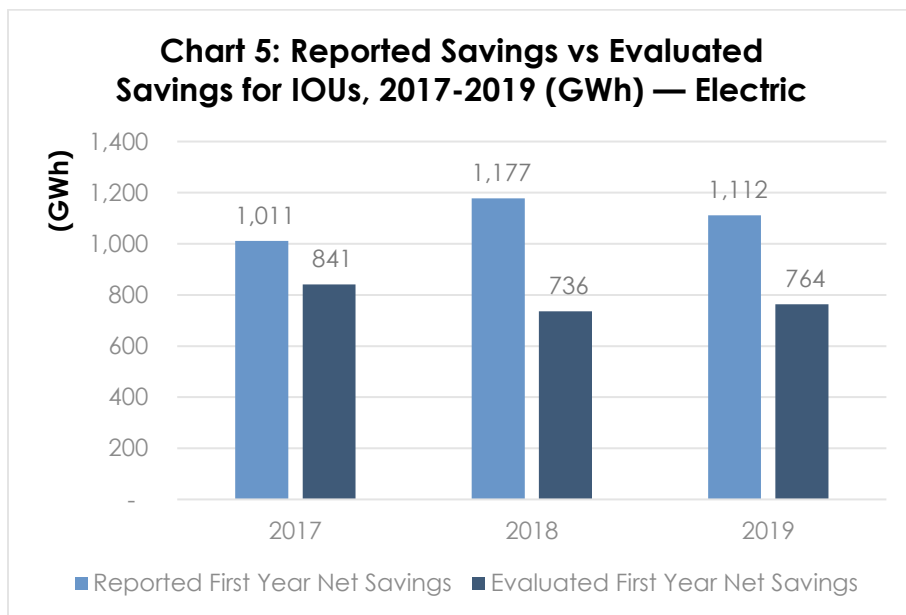
Exclusive of IOUs' statewide codes and standards program

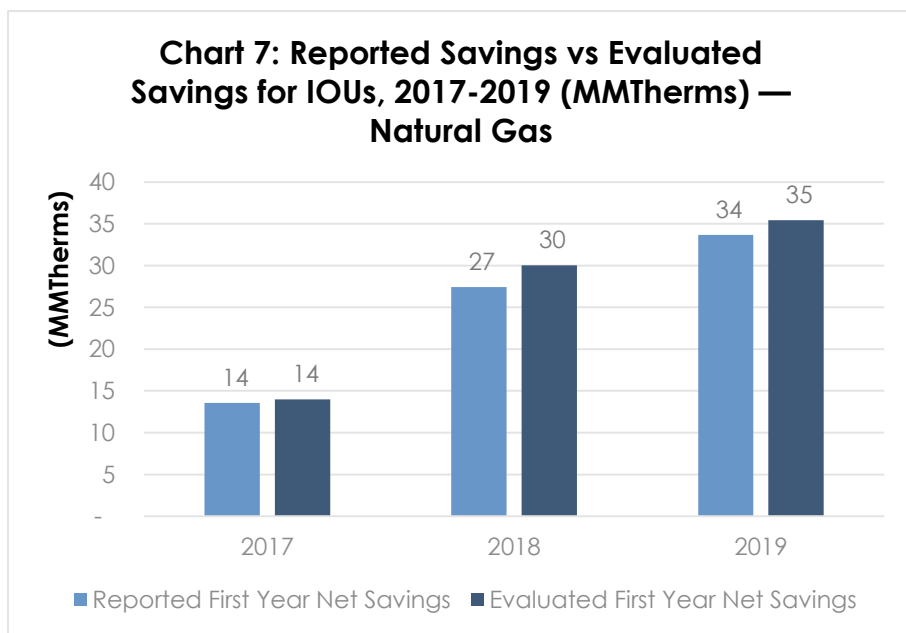
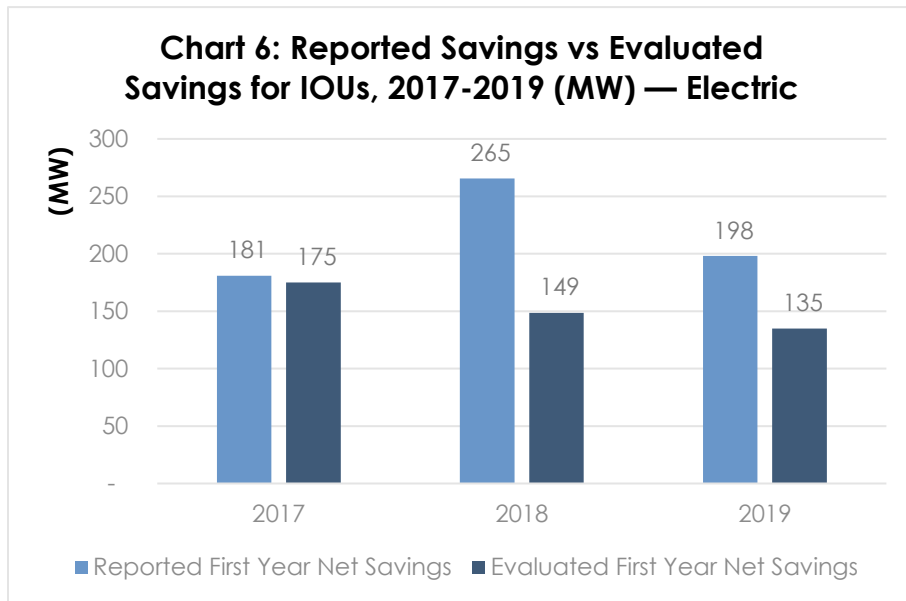
2017 figures are gross savings (left of dotted line)

2018 and 2019 figures are net savings

Investor-Owned Utility 2017-2019 Reported Energy Savings vs. Evaluated Savings – First Year

The previous section compared portfolio goals and savings. This section compares what the IOUs reported they saved through their programs to what the CPUC independently verified was saved by the programs. First year evaluated GWh electricity savings were lower than IOU reported savings in all three years, with 2017 measuring the smallest difference at roughly 17 percent. The opposite was true for natural gas, with all three years showing higher evaluated savings in comparison to reported savings. Program year 2018 had the largest difference, with evaluated savings measuring 9.5 percent larger than reported.





At the sector level, most of California’s EE savings came from the residential sector. The commercial sector was the second largest contributor of savings. The “Cross-Cutting” identifier refers to programs that targeted multiple sectors, for example, on-bill financing.

Chart 8: Evaluated Savings for IOUs by Sector (GWh), 2017-2019

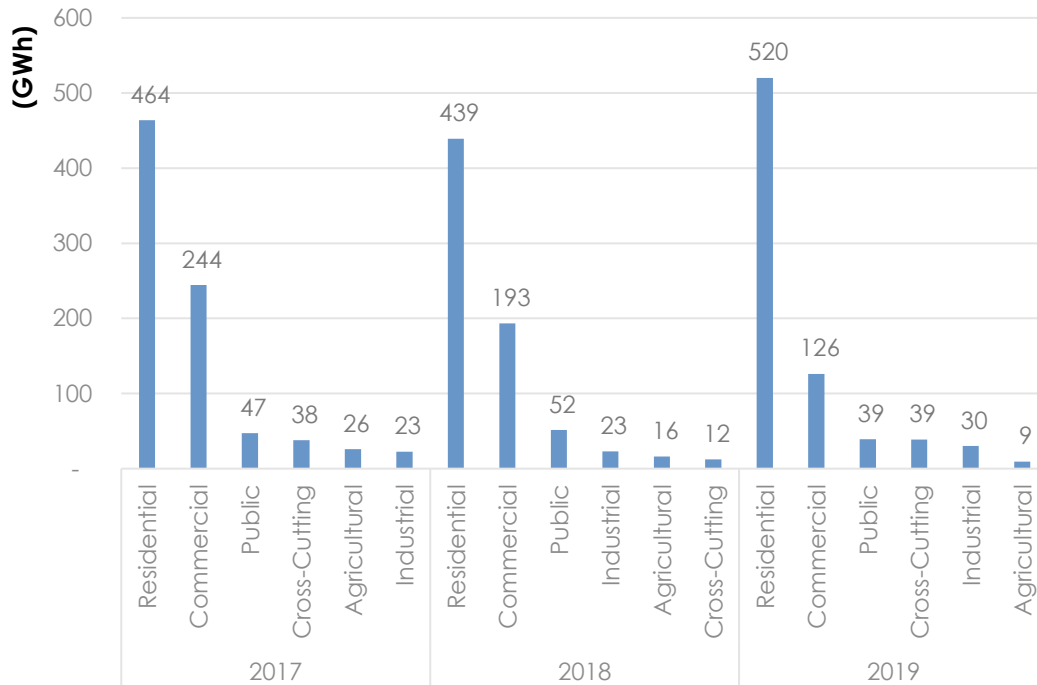
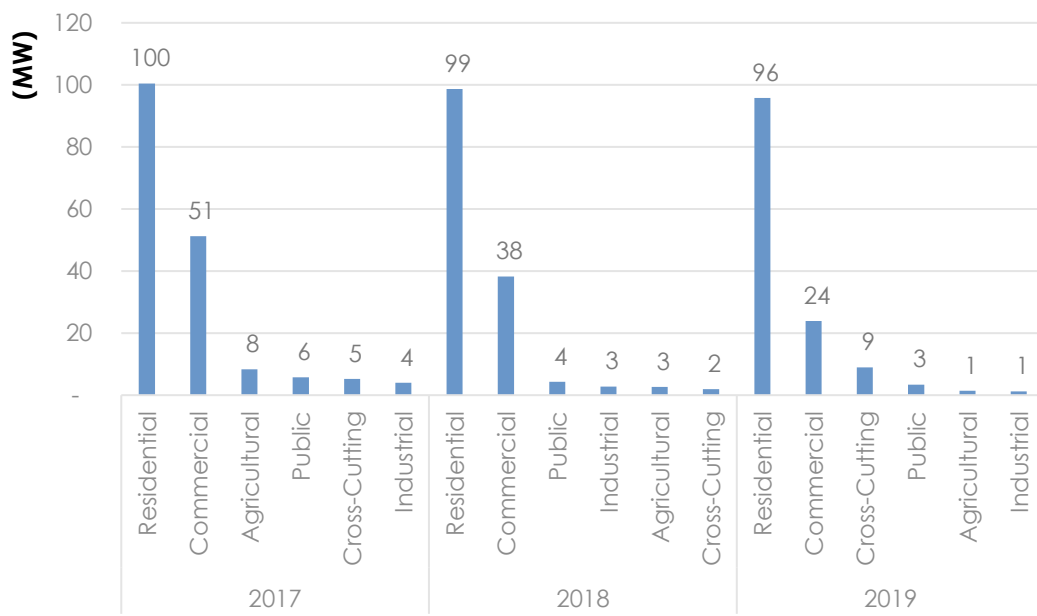
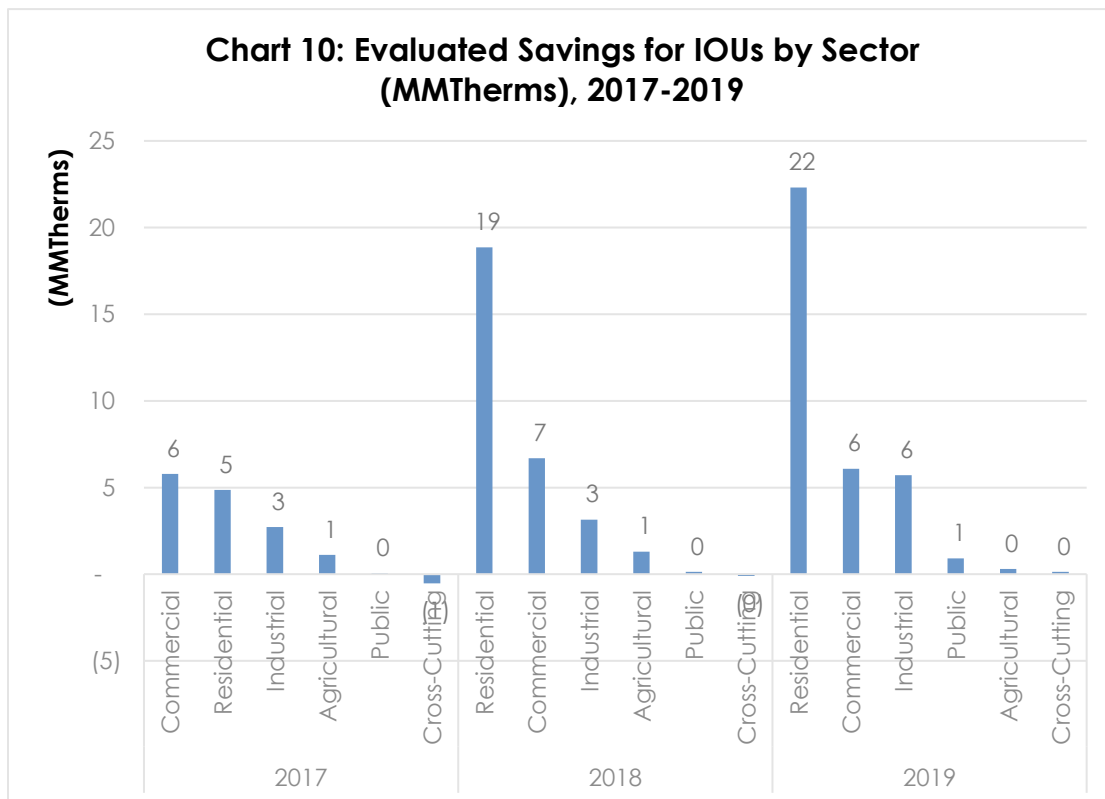


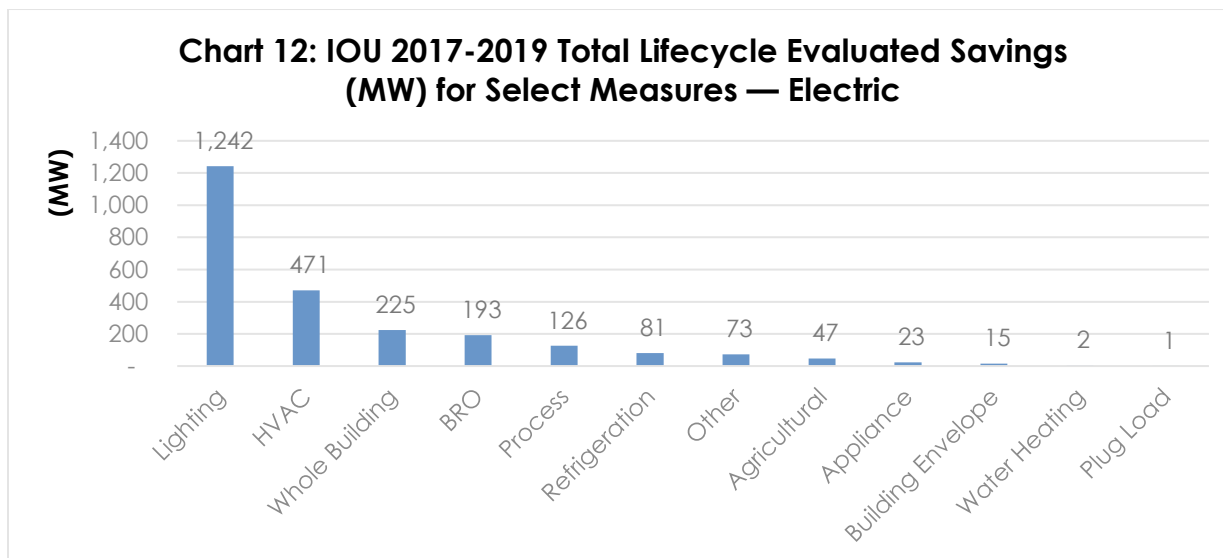
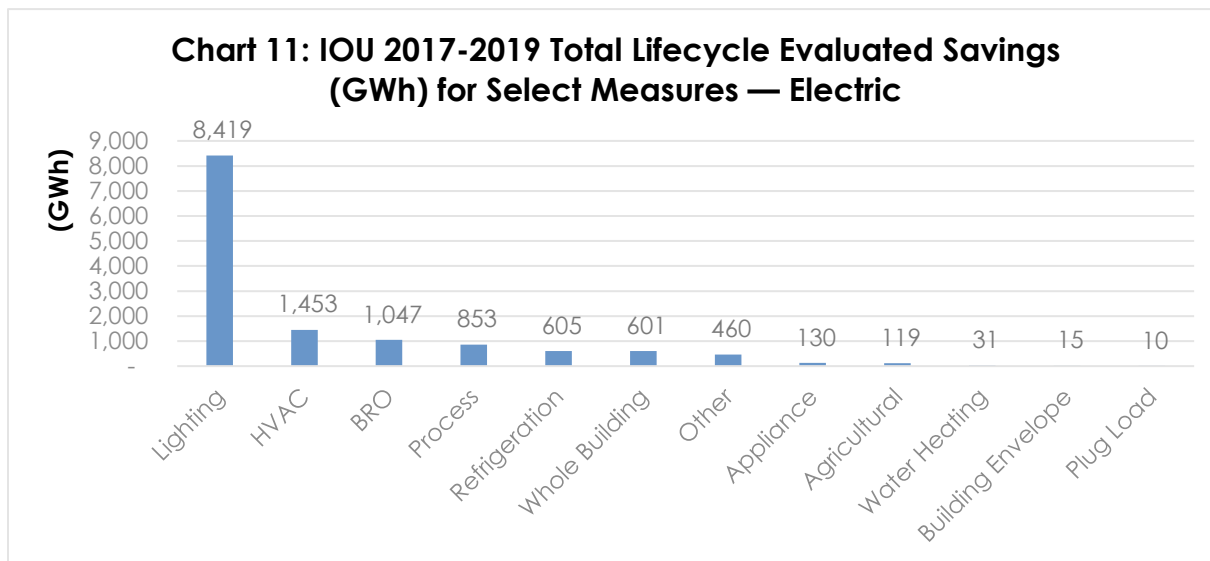
Chart 9: Evaluated Savings for IOUs by Sector (MW), 2017-2019



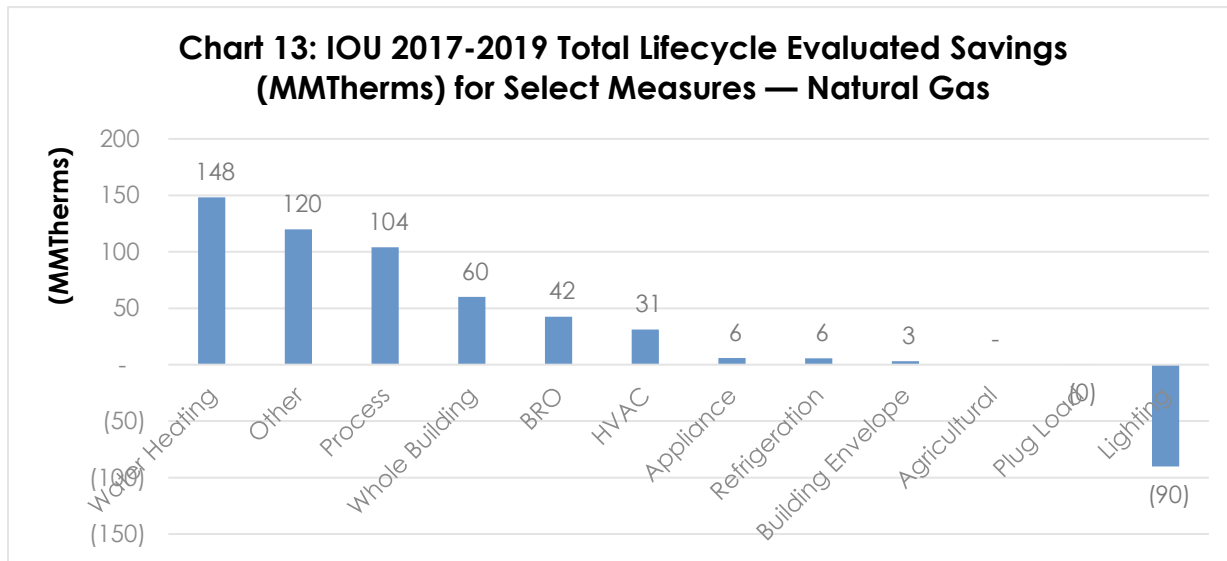


Investor-Owned Utility 2017-2019 Lifecycle Evaluated Savings

In comparison to first year EE savings, lifecycle savings accrue over the useful lifetime of the equipment or measure that was installed. On the electric side, due to the long lifetime of LEDs, lighting measured the largest GWh and MW evaluated savings over the course of 2017-2019 despite issues with the primary lighting program as discussed previously, contributing more than five times the GWh savings of Heating, Ventilation and Air-conditioning (HVAC) installations and more than eight times the GWh savings of Behavior, Retrocommissioning, and Operations (BRO) programs.

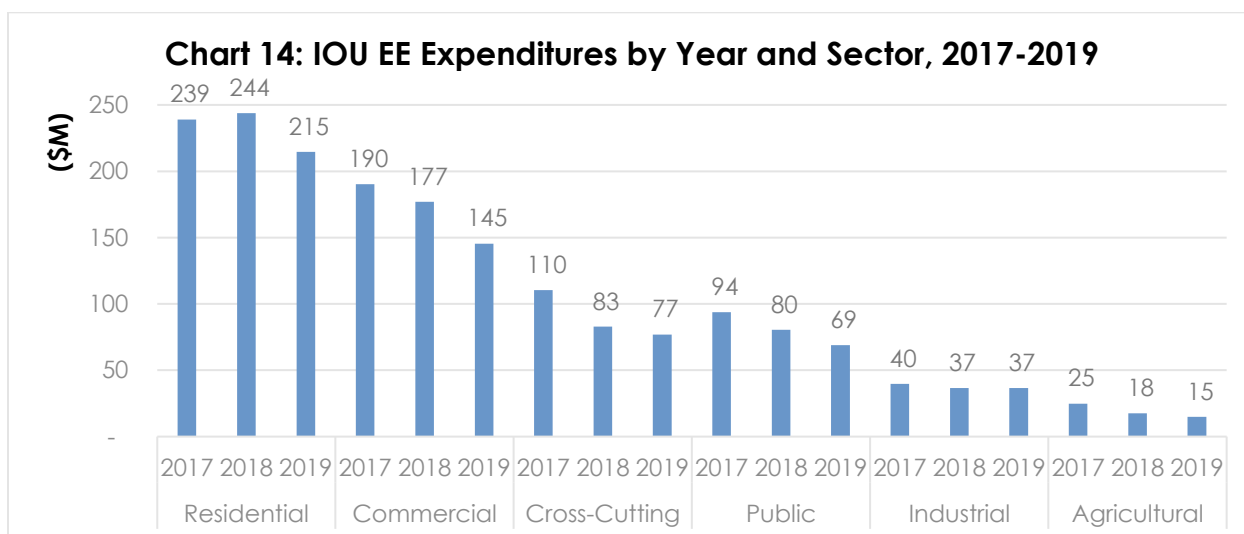


For natural gas savings, water heating accounted for the largest share of lifecycle savings over the 2017-2019 period. Lighting shows negative MMTherms savings due to “interactive effects” associated with electric savings, i.e., more efficient lamps have a secondary impact on heating and cooling loads and thus heating and cooling energy consumption.

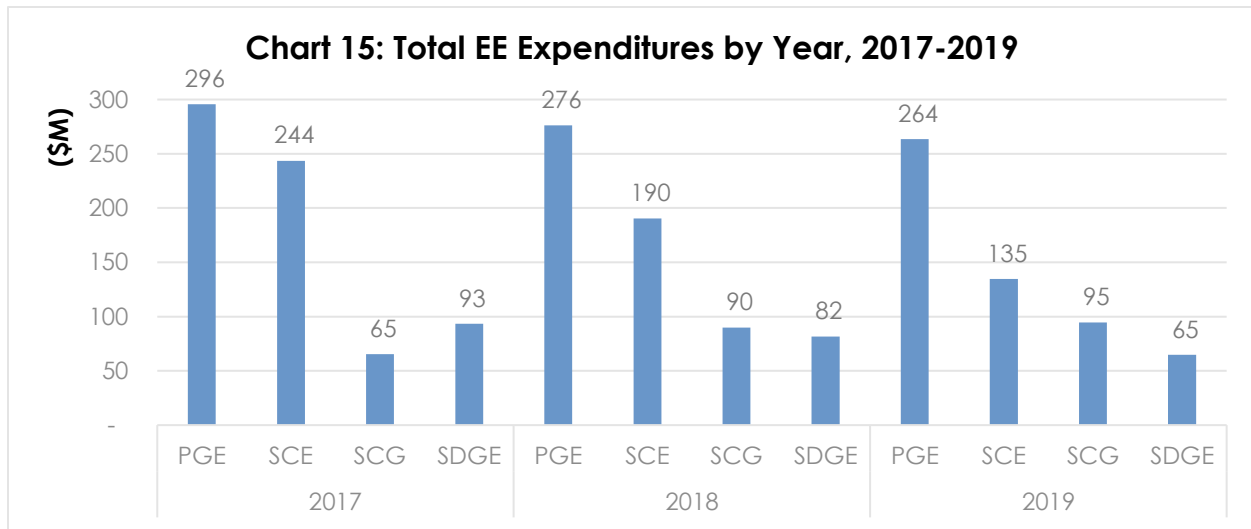


Program Administrator Energy Efficiency Expenditures, 2017-2019

IOU program administrator spending on EE programs totaled more than \$698 million in aggregate in 2017, \$638.2 million in 2018 and \$557.5 million in 2019. The residential sector recorded the largest expenditures, averaging \$232.5 million annually over the three-year span, followed by the commercial sector, which averaged \$170.8 million a year over the same time period.



IOU EE expenditures varied greatly each year, with PG&E spending the largest amount, followed by SCE. PG&E’s expenditure levels were relatively consistent each year compared to the others, with only a slight decline between 2017 and 2019. Overall, IOUs spent nearly \$1.9 billion on EE programs between 2017 and 2019, with annual spending levels decreasing over time. Five programs accounted for a nearly \$100 million decrease in annual EE expenditures between program years 2017 and 2019: primary lighting, energy upgrade California, nonresidential HVAC and commercial deemed incentives.



Section 2 – CPUC Energy Efficiency Decisions and Studies

This section includes a summary of the major EE decisions adopted by the CPUC between 2017 and 2019. The CPUC also conducted dozens of evaluation studies between 2017 and 2019, and this section highlights three evaluation studies.

CPUC Decisions

Decision Regarding Frameworks for Energy Efficiency Regional Energy Networks and Market Transformation

The CPUC approved [Decision 19-12-021](#) in December of 2019, which authorized the continued operation of existing RENs and invited new REN proposals to be filed with the CPUC. This decision also clarified that any geographic overlap between more than one REN and other program administrators may be permitted; that RENs are designed to fill program administrator gaps and service hard to reach customers; that there is no upfront cost effectiveness threshold required for RENs; and that RENs are not confined to a particular program or customer segment.

Additionally, the decision adopted market transformation framework elements that were proposed by the California Energy Efficiency Coordinating Committee (CAEECC) and directed PG&E to hire a third-party EE administrator to oversee market transformation initiatives.

Decision Adopting Energy Efficiency Goals for 2020-2030

CPUC's August 2019 [Decision 19-08-034](#) adopted new energy savings goals for EE program portfolios for 2020-2030 based on an assessment of market potential using the Total Resource Cost test. This decision adopted goals that were lower than previous potential studies, due to California's successful transformation of the lighting market, with efficient lighting technologies now considered standard practice.

Decision Modifying the Energy Efficiency Three-Prong Test Related to Fuel Substitution

The CPUC approved [Decision 19-08-009](#) in August of 2019, which modified the formulation of the EE three-prong test that was originally established in Decision 92-02-075 and changed it to the Fuel Substitution Test. With the State of California increasingly focused on the potential for replacement of appliances that use natural gas with appliances that use electricity to address emissions reduction goals, the decision reformulated the test for fuel substitution savings to use the same baseline as other measures in the EE portfolio. Additionally, the decision imposed requirements for fuel substitution measures to save energy and not harm the environment, as measured by greenhouse gas emissions. The decision also removed the

requirement for fuel substitution to pass a cost-effectiveness threshold at the measure level and instead allows the cost-effectiveness calculation to be rolled into a program administrator’s overall EE portfolio.

Decision Adopting Standard Contract For Energy Efficiency Local Government Partnerships

CPUC’s August 2019 [Decision 19-08-006](#) adopted a standard contract for EE local government implementers, and associated implementation details.

Decision Addressing Workforce Requirements and Third-Party Contract Terms and Conditions

CPUC’s October 2018 [Decision 18-10-008](#) required workforce standards for EE programs that involve large non-residential HVAC and lighting projects. The requirements were intended as a starting point that could grow into more far-reaching requirements in the future, including coordination with the California Energy Commission and the adoption of a “responsible contractor policy” as set forth by Senate Bill 350 (DeLeon, 2015). The decision also required certain standard and modifiable terms and conditions that utility program administrators must include in their contracts with third party designers and implementers of EE programs.

CPUC’s July 2019 [Decision 19-07-016](#) corrected an editing error in Decision 18-10-008 addressing workforce requirements and third-party contract terms and conditions.

Decision Addressing Energy Efficiency Business Plans

CPUC’s May 2018 [Decision 18-05-041](#) approved the EE business plans of the following program administrators: PG&E, SDG&E, SCG, SCE, BayREN, SoCalREN, Tri-County REN and Marin Clean Energy. The business plans, sector strategies and associated approved budgets run between 2018 and 2025. The decision included a required set of metrics to track progress and provided policy guidance in several areas, including incentive design.

Decision Addressing Third Party Solicitation Process for Energy Efficiency Programs

CPUC’s January 2018 [Decision 18-01-004](#) approved a two-stage solicitation approach to soliciting third party program design and implementation services as part of the EE portfolio. The decision requires all IOUs to conduct a Request for Abstract solicitation followed by a full Request for Proposal stage. Additionally, IOUs were required to utilize procurement review groups for design and conduct of solicitations, as well as hire an independent evaluator specifically for their EE expertise.

Decision Regarding To-Code Pilots

CPUC’s November 2017 [Decision 17-11-006](#) directed IOUs to discontinue “To-Code” EE pilot programs and directed IOUs to instead work with other PAs and third party implementers to report on to-code program research questions through their program design, implementation and evaluation activities. The decision also declined to require, PAs to employ randomized control trial designs for specific programs.

Decision Adopting Energy Efficiency Goals for 2018-2030

CPUC's September 2017 [Decision 17-09-025](#) adopted new EE goals for 2018-2030 based on assessment of economic potential using the Total Resource Cost test, the 2016 update to Avoided Cost Calculator and a greenhouse gas adder that reflected the California Air Resources Board Cap-and-Trade Allowance Price Containment Reserve Price. The decision also deferred adoption of cumulative goals until Staff could assess a method for calculating savings persistence, which was to be developed by the California Energy Commission.

Decision Addressing Energy Efficiency Financing Pilot Programs

CPUC's March 2017 [Decision 17-03-026](#) reiterated the CPUC's support for the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) as the program administrator to test new and innovative financing strategies to achieve aggressive EE goals. The CPUC also committed to continue funding for CAEATFA to administer pilot programs beyond the original two-year test period for each individual pilot. The decision also kept the CAEATFA financing pilot program separate from the larger EE rolling portfolio business plans, but specified that each pilot program would be subject to a mid-point evaluation that would determine its permanent status.

Select CPUC Studies

For a list of all CPUC studies please visit: <https://pda.energydataweb.com/#/>

CPUC Impact Evaluation of Water Heating Measures – Program Year 2019

CPUC's [report](#) on water heater EE programs for program year 2019 found program influence was lower than expected for single family occupants, with net-to-gross ratios of less than 50 percent for each water heater category. In contrast, program influence on multifamily end-users was near 100 percent regardless of equipment type, which was attributable to structural differences in the market. Additional important findings from the report include: rebates had a modest impact on single family water heating installations; the single-family market moved towards tankless systems, with fuel substitution uncommon; the potential for demand response was found to be significant; and there were hurdles to overcoming water heating electrification, including awareness and upfront costs.

Upstream and Residential Downstream Lighting Impact Evaluation Report – Program Year 2019

This [report](#) evaluated 2019 upstream lighting programs, which provided monetary incentives to manufactures (and in some cases, large retail chains) to encourage deployment and stocking of applicable light emitting diode (LED) light bulbs. As discussed in Section 1, these programs were found to have shipped significantly more light bulbs to discount and grocery stores than those stores could have reasonably stocked and sold, particularly in SCE and SDG&E territories. Evaluators made adjustments totaling more than 15 million light bulbs statewide to capture actual store sales more accurately, which resulted in a reduction of 59 percent of the savings originally reported by the PAs.

Separately, the report found that the lighting market had been transformed over the previous decade, with LEDs as the dominant technology and preferred choice by most consumers.

Nonresidential Lighting Sector Final Impact Evaluation – Program Year 2019

This [study](#) evaluated energy efficient LED indoor tubes and fixtures, a subset of the commercial lighting programs PG&E, SCE and SDG&E oversaw in program year 2019. Evaluators found that indoor LED tubes and fixtures were primarily replacing inefficient fluorescent tubes and fixtures, and each IOU was highlighted to have potentially missed opportunities to capture additional installations through traditional customer rebates (SCE, SDG&E) or distributor incentives (PG&E). Additionally, the programs were found to be influential in customers' decisions to install LED tubes, as overall PA net-to-gross ratios ranged from 68 percent to 75 percent.

Conclusion

California is well known for its ambitious environmental goals and for developing policies and regulations to bolster the State's clean energy transformation. This report demonstrates the progress being made toward achieving electricity and natural gas efficiency savings for the utilities the CPUC regulates. As shown in the report, during the 2017-2019 period, the IOUs made meaningful headway towards achieving CPUC-established electricity and gas goals, although they did not reach the goals for all metrics. Specifically, the EE program portfolio saved 2,341 gigawatt-hours of electricity, 458 megawatts of demand, and 79 million therms of natural gas, excluding additional energy savings resulting from the IOUs' codes and standards advocacy efforts.

Common Acronyms

BRO – Behavior, Retrocommissioning, and Operations

C&S – Codes and Standards

CAEATFA – California Alternative Energy and Advanced Transportation Financing Authority

CAEECC – California Energy Efficiency Coordinating Committee

CCA – Community Choice Aggregator

CPUC – California Public Utilities Commission

EE – Energy Efficiency

GWh – Gigawatt Hours

HVAC – Heating, Ventilation, and Air Conditioning

IOU – Investor-Owned Utility

LED – Light Emitting Diode

MMTherms – Million Therms

MW – Megawatt

PA – Program Administrator

PG&E – Pacific Gas & Electric Company

REN – Regional Energy Networks

SCE – Southern California Edison

SCG – Southern California Gas Company

SDG&E – San Diego Gas Electric