



***DRAFT SoCalGas Energy Efficiency Business Plan
Submitted to CAEECC on October 18, 2016***

The attached business plan is submitted in draft form. SoCalGas has been working to develop a business plan that will meet all compliance requirements and incorporate stakeholder feedback received through the CAEECC forum.

This first draft of the full business plan may not address all the business plan requirements and/or stakeholder feedback. SoCalGas recognizes that the following elements of the business plan are still under development and not included in this draft:

- Portfolio and sector-level budgets
- Portfolio and sector-level savings forecasts
- Portfolio and sector-level cost-effectiveness
- Proposals for statewide programs and/or subprograms that comprise at least 25 percent of their portfolio budgets, and lead administration assignments
- Proposals for at least four downstream programs to be piloted on a statewide basis, including a proposed lead administrator and other program details
- Plan to transition at least 60% of portfolio to third parties by the end of 2020 (including solicitation schedule)
- Responses to all stakeholder feedback received to date via the CAEECC process

Executive Summary

Draft

October 18, 2016



SoCalGas



A Sempra Energy utility

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DRAFT

Executive Summary

For more than 145 years, the Southern California Gas Company (SoCalGas) has served Central and Southern California as a responsible and engaged environmental leader, employer, and neighbor. As the nation's largest natural gas distribution utility, SoCalGas delivers clean, safe, and reliable energy to 21.6 million consumers through 5.9 million meters in more than 500 communities. The service territory encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from Visalia to the Mexican border. The service territory covers 12 counties, 220 incorporated cities, and at least as many unincorporated communities. Included are most of the region's heavily populated areas, with the exception of the City of Long Beach and the County of San Diego.

SoCalGas will continue to be leaders in delivering innovative customer assistance and energy efficiency programs that are valued by customers, sensitive to the environment, stimulate the economy, and make a difference in the communities served. The SoCalGas core values, with respect to energy efficiency, are to provide cost-effective, customer-centric solutions that will ultimately support the economic viability of all of our customers.

SoCalGas' mission is to offer a suite of energy efficiency (EE) solutions that incorporates the best available technologies and services valued by customers, contributes to achievement of energy efficiency goals, and that ultimately aligns with the State's energy efficiency policies - including a doubling of energy efficiency in California by 2030. SoCalGas' vision integrates the ideals of innovation, partnership, and customer-centric approaches to influence customers and their EE decisions.

I. Overview & Approach

A. Overview

1. California Energy Efficiency Goals

There are a number of newly adopted legislative bills providing specific guidance for the future of energy efficiency in California. From Senate Bill (SB) 350 to Assembly Bills (AB) 793, 758 and 802, there are several new directives that are helping to shape the next generation of energy efficiency program offerings. The primary goal is set by SB 350, which calls for a doubling of the energy efficiency levels in California by 2030. With this goal set, a number of legislative and regulatory directives provide a pathway for SoCalGas and other program administrators to follow that will help shape the next generation of energy efficiency program offerings. The California Public Utilities Commission (CPUC) has also issued specific guidance to program administrators on how to formulate the energy efficiency business plans to achieve the State's new energy efficiency goals. In response, SoCalGas has reshaped existing program strategies and envisions new, innovative approaches to meet these specific directives. These program strategies are presented in each of the sector-based chapters within this energy efficiency business plan.

2. Key Trends

There are number of key trends that are influencing how SoCalGas provides energy efficiency programs to its customers. Below are a few key trends affecting various customer sectors in SoCalGas' service territory:

- **Legislative Mandates** – There are several legislative mandates levied upon various public customers to promote deeper EE retrofits, including SB 350, AB 793 and AB 802
- **Increased Tax Revenues For Public Sector** – California has mainly recovered from the 2008 recession and is now experiencing surplus tax revenue. This creates an opportunity to direct funds to assist public customers in reducing the financial barriers to energy efficiency.
- **Public Sector Organizational Mandates** – Various public sector customers have instituted organizational mandates such as the University of California's carbon neutrality initiative to realize net zero greenhouse gases from its buildings by 2025. Achievement of these types of goals relies heavily upon assistance from energy efficiency programs.
- **ARRA Funding** – American Recovery and Reinvestment Act of 2009 (ARRA) helped spur investments in energy efficiency solutions for customers in the public sector. There are remaining funds available to many local governments which can empower them to invest in energy efficiency and other demand-side management solutions to better manage their energy.
- **Recession Continues in Rural Communities** – Recent economic studies project rural communities in California, especially in the San Joaquin Valley, to continue to have sluggish economies in contrast to other areas within the state.
- **Water** – The agricultural sector faces significant issues in water. Water availability is a very large concern for growers as a result of persistent drought in California; limited water availability is leading to increased water pumping. As various segments use different water management approaches, energy management solutions can play an integral role in efficient use of energy and water.
- **Agricultural Labor** – The agricultural sector is experiencing a decreased labor supply and, as a result, an increase in labor costs. The increased labor costs severely limit the agricultural customer's ability to invest in more energy efficient equipment and processes.
- **Port activity and the growing importance of e-commerce continue to drive improvement in the Inland Empire's industrial real estate market** – The Inland Empire is one of the strongest and most dynamic industrial markets in the nation, benefiting

from logistics advantages, high demand, growing lease rates and a substantial amount of available land for future industrial projects. The outlook for the market continues to be positive beyond 2016. Alone among the southern California five-county region, the Inland Empire's new development and construction is expected to be strong with demand easily absorbing new supply.

- **New construction gaining momentum for the industrial sector** – The outlook for industrial development is much more optimistic, especially for warehouse and distribution facilities.
- **Builders Focus on Multifamily New Construction** – Due to higher construction and property costs, new homebuilders are building multifamily dwellings in areas in southern California historically dominated by the single-family segment. For example, Orange County, an area where single-family construction has dominated for decades, is now experiencing higher construction in the multifamily segment, closer to metropolitan areas throughout the county.
- **High Levels of Renters in Single-family Segment** – Over the past few years, the single-family segment has experienced a growth in rentals of single-family dwellings. Los Angeles County has experience an increase in rental demand in all segments since 2010¹, causing issues regarding split-incentives to become more prevalent. Due to the high cost to own relative to income, this trend is expected to continue.
- **Low vacancy rates in the industrial sector** – The vacancy rate of industrial real estate, a key economic indicator, has steadily declined from a high of about 6% in 2011 to 1.2% in Q1 2016,² and Los Angeles exhibits the lowest vacancy rates of the ten largest markets across the United States.³ This creates an opportunity for more industrial customers to invest in efficiency improvements for their buildings and processes.

B. Vision and Goals

The vision for the energy efficiency business plan sets the tone and direction for the next generation of SoCalGas energy efficiency program offerings. It is vitally important that it is clear, concise and connected to California's overall energy efficiency vision. This business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape the vision. There are number of other influences that helped shaped the energy

¹ HUD PD&R Housing Market Profiles: Los Angeles-Long Beach-Glendale, California, September 1, 2013, p. 4. Accessed at https://www.huduser.gov/periodicals/USHMC/reg/LosAngelesCA_HMP_508_Sep13.pdf.

² "Southern California Industrial Real Estate Market Heats Up." Journal of Commerce. October 9, 2014.

³ "Industrial Markets in Southern California Show Sustained Strength in Q1 2014." Accessed at <http://www.cbre.us/o/losangelesmarket/los-angeles-media-center/Pages/INDUSTRIAL-MARKETS-IN-SOUTHERN-CALIFORNIA.aspx>

efficiency business plan vision including: CPUC policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input and program experience.

Vision:

To offer a suite of solutions that incorporates the best available technologies and services valued by our customers, contributes to achievement of energy efficiency goals, and that ultimately aligns with the State’s overarching energy and environmental goals.

Key energy efficiency portfolio goals:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services;
- Cultivate, promote, and sustain lasting energy efficient operations and practices; and
- Meet customers’ energy efficiency adoption preferences through a range of simplified offerings that address customer energy efficiency needs.

TABLE 1.0: ENERGY SAVINGS GOALS⁴

Gross Energy Savings Goals (2018-2028) by Sector	MMtherms
Residential	Tbd
Public	Tbd
Commercial	Tbd
Industrial	Tbd
Agricultural	Tbd
Subtotal	Tbd
Codes & Standards	-
Emerging Technologies	-
Workforce Education and Training	-
Total (2018-2028)	263.4

C. Strategies and Approaches

1. Overview of Intervention Strategies

Since the 1990s, California has embraced the notion that energy efficiency program intervention strategies, coupled with government intervention (e.g., public policies and laws), can permanently reduce market barriers so customers can achieve higher levels of energy efficiency. In a transformed market, customers will naturally adopt higher levels of energy efficiency without the need for such program and government interventions. All programs, resource and non-resource, contribute in some way to reducing market barriers in order to achieve the desired, long-lasting market effects.⁵ The current CPUC market transformation definition is stated below:

⁴ Gross Total Annual MMtherm goals set in D.15-10-028, but will be adjusted to net goals per D.16-08-019.

⁵ “Market transformation is not a label that uniquely identifies certain energy efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees.” [A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prah, and Jeff Schlegel]

“Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.”⁶

To identify the appropriate program strategies, the business plan identifies sector-specific problem statements with corresponding resolutions or desired outcomes. Sector-specific program strategies are presented that will reduce current market barriers. Program delivery will rely on a combination of third-party delivered statewide and local programs. These programs will be supplemented with SoCalGas support that will enable third party program implementers and customers to work together. A summary list of the various programs strategies is presented below. Details about each intervention strategy are presented in each sector chapter of this business plan.

⁶ D.09-09-047, pp. 88-89.

TABLE 2.0: PROGRAM INTERVENTION STRATEGIES LIST

Program Intervention Strategies					
Strategy	Residential	Public	Commercial	Industrial	Agricultural
Partnering					
• Utility Partners	Existing	Existing	New	New	New
• Industry Partners	New	New	New	New	New
• Customer Partners	New	Existing	New	New	New
Intelligent Outreach					
• Data Analytics	New	New	New	New	New
• Virtual Engagement	New	New	New	New	New
• Energy Advisor	Existing	Existing	Existing	Existing	Existing
• Energy Management Technology	New	New	New	New	New
• Industry EE Best Practices	New	Existing	New	New	New
• Disadvantaged Community Outreach	New	New	New	New	New
• Single Point of Contact	New				
Technical Assistance	New	Existing	Existing	Existing	New
Strategic Energy Management	New	New	New	New	New
Customer Incentives					
• Pay-for-Performance	New	New	New	New	New
• Customized Incentives		Existing	Existing	Existing	Existing
• Deemed Incentives	Existing	Existing	Existing	Existing	Existing
• Bundled Measures	Existing	New	New		
• Whole Building	Existing	Existing	Existing	Existing	Existing
• Retrocommissioning		Existing	Existing	Existing	
Direct Install					
• Standard DI	Existing	Existing	New	New	New
• Comprehensive DI	New	New	New	New	New
Midstream EE Equipment	Existing	Existing	Existing	Existing	Existing
Financing	Existing	Existing	Existing	Existing	Existing
Innovative Design	Existing	Existing	Existing	Existing	Existing
Crosscutting Coordination					
• Emerging Technologies	Existing	Existing	Existing	Existing	Existing
• Workforce Education Training	Existing	Existing	Existing	Existing	Existing
• Codes & Standards	Existing	Existing	Existing	Existing	Existing

2. Budgets & Cost-Effectiveness

[Budgets and Cost-effectiveness -TBD]

[Pending revisions to 2018 avoided costs estimates]

TABLE 3.0: PORTFOLIO ENERGY SAVINGS & COST EFFECTIVENESS FORECAST

Program Impacts	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
MWh	-	-	-	-	-	-	-	-	-	-	-
MW	-	-	-	-	-	-	-	-	-	-	-
Therms	TBD										

Emissions

CO2	TBD										
PM-10	TBD										
NOx	TBD										

Cost-effectiveness TRC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

Cost-effectiveness PAC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

3. Key Challenges

There are several market barriers present within each sector that inhibit customers from achieving higher levels of energy efficiency. Market barriers are a byproduct of market sector characteristics and customer behavior within a specific sector. Program strategies are temporary interventions introduced into the market sector to reduce these market barriers to create real, lasting market changes. To realize the desired sector outcomes, several coordinated and integrated program intervention strategies will be deployed throughout the various market channels to increase customer EE adoption levels. This will support the vision of increased adoption of EE products and behavioral practices.

In certain instances, a customer may behave in manner similar to those in other sectors. For example, a commercial retail customer may also act as an industrial processing plant in a shared facility. In those instances, intervention strategies from various sectors will be offered to these multi-dimensional customers in a coordinated offering.

Due to the limited natural gas usage within many of the customer segments and the need to simplify customer engagement in the delivery of Demand Side Management programs, SoCalGas proposes to coordinate program delivery with local utilities (electric and water), where practicable. This will allow for simplified customer engagement and will empower the customer to implement a complete energy and water efficiency plan.

4. Intervention Strategies

The business plan chapters provide a comprehensive list of program intervention strategies directed at SoCalGas' customer sectors. The strategies are intended to overcome the various market barriers identified in this business plan to achieve permanent market effects. These strategies will be deployed in a cohesive manner at various stages during the execution of the business plan.

a) Lessons Learned from Past Cycles

[pending]

b) Sector Metrics

To gauge sector progress towards the achievement of the desired sector outcomes, the business plan proposes a set of key metrics for each sector and crosscutting program activity. Each sector chapter identifies key milestones in the advancement towards a set of desired sector outcomes. In most cases, the desired outcome is expected well beyond the near and mid-term implementation horizon. To properly monitor progress towards the desired outcome over time, the metrics will rely on data currently collected, tracked and verified as part of the program administrator's data requirements (e.g., energy savings, customer participation, etc.). This approach improves the accuracy and timeliness of metric tracking for both the program portfolio manager and the CPUC while keeping the monitoring costs to reasonable levels. Sector metrics and targets may change over the ten-year rolling portfolio cycle, as SoCalGas and its implementers deliver programs and learn more about market characteristics and responsiveness to intervention strategies.

5. Compare/contrast this portfolio with past cycles

In past program cycles, program portfolios were offered based on specific programs and/or technologies. The sectorial business plan approach is based on customer needs and expectations, within like customer groups, proactively offered in a deliberate and efficient manner in order to significantly increase the adoption of customer energy efficiency solutions among all customer types within the sector. Taking advantage of new AMI technology, customer energy usage habits can now be examined and categorized through efficient and continuous data analytics, to identify how customers can permanently incorporate energy efficiency into their homes and businesses. No longer are energy efficiency programs passively offered when customers decide to participate; now customers are actively encouraged to

modify energy behaviors and to invest in the right energy efficiency upgrades at the right time, based on a coordinated set of program offerings, to improve the overall efficiency of their energy usage.

In addition to proven program strategies, SoCalGas will incorporate new program strategies and corresponding program tactics to arrive at a complete energy efficiency solution set for the customer. The proven and new program strategies are further detailed in the Program Intervention Strategies section of each sector chapter. These offerings will be introduced to the customers over time and may be withdrawn and retooled in order to adapt to market changes and responses.

6. Incorporating Guidance from CPUC and EM&V Study Recommendations & Observations

In addition to the newly adopted legislative bills providing specific guidance for the future of energy efficiency in California, such as SB 350 and AB 802, the CPUC has also issued guidance to program administrators on how to further formulate the energy efficiency business plans. In response, SoCalGas has reshaped existing program strategies and envisions new, innovative approaches to meet these specific directives. A summary of the recent legislative and regulatory directives along with SoCalGas' proposed program strategies to address these directives are detailed in Appendix B.

The evaluation, measurement, and verification (EM&V) process includes sector-related market studies, load impact, programs, process evaluations, and potential studies on energy efficiency programs and market segments from previous program years. The sector business plans incorporate, with and without modifications, various recommendations that have not previously been incorporated into the existing energy efficiency programs. A list of referenced EM&V studies applied in the business planning process is shown in each sector chapter of the business plan.

D. Significant Changes from Existing Portfolio

CPUC Decision 16-08-019 created significant changes to statewide program administration and third party program offerings in energy efficiency portfolios. This decision directed program administrators to include in the business plans a proposal for transitioning the majority of portfolios to be outsourced, with a minimum of 60 percent of the budgeted portfolio transitioned by the end of 2020. In addition to changes to the third party requirements, all upstream and midstream programs and four downstream programs are directed to be delivered on a statewide basis, by a one or more non-utility implementers under contract with single lead program administrator. The business plan will present details of each statewide program.

E. Conclusion

As detailed in this business plan, SoCalGas will provide a comprehensive portfolio of reliable, innovative, and cost-effective energy efficiency programs and strategies to achieve deeper energy efficiency penetration in the marketplace. SoCalGas is committed to achieving its energy efficiency goals and supporting the State's energy efficiency policies and targets. By integrating the ideals of innovation partnership, and customer-centric approaches, SoCalGas seeks to create impactful solutions that are valued by customers, sensitive to the environment, stimulate the economy and make a difference in the communities we serve.

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Agricultural Sector Chapter

Draft

October 18, 2016



SoCalGas

A  Sempra Energy utility

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A. Executive Summary

Southern California Gas Company’s agricultural sector represents about 1% of the natural gas consumed by all customers. California agriculture is a \$54 billion industry that generates at least \$100 billion in related economic activity. California’s agriculture sector is diverse and robust, with each segment interlinked with the others in a network of common culture and commerce. Unlike the single crop monocultures of wheat and corn in the Midwest, the farmers and ranchers of California grow a multitude of crops – from alfalfa to zucchini – that provide the greatest agricultural bounty of any state in the country. Although energy is an important aspect of their business, the primary focus of the agricultural customers is on the health and yield of their crops.

The agricultural sector business plan includes a combination of proven and newer program strategies coupled with inventive approaches to efficiently identify customers with the greatest energy efficiency opportunities using data analytic advancements enabled by SoCalGas’ newly implemented AMI infrastructure, where feasible. To encourage greater adoption of energy efficiency among all agricultural customer segments, SoCalGas will offer a simple, low cost suite of strategies that are tailored to the unique customer characteristics of the agricultural sector. A targeted focus will also be applied to agricultural customers who operate in disadvantaged communities throughout the service area, which includes most rural communities.

1. Summary Tables [Pending Revised Avoided Costs]

Table A.1: Sector Forecast: Agricultural

Program Impacts	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
MWh	TBD										
MW	TBD										
Therms	TBD										

Emissions

CO2	TBD										
PM-10	TBD										
NOx	TBD										

Cost-effectiveness TRC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

Cost-effectiveness PAC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

2. Proposal Compared To Prior Cycles

In past program cycles, program portfolios were offered based on specific programs and/or technologies. The sectorial business plan approach is based on customer needs and expectations, within like customer groups, proactively offered in a deliberate and efficient manner in order to significantly increase the adoption of customer energy efficiency solutions among all customer types within the sector. Taking advantage of new AMI technology, customer energy usage habits can now be examined and categorized (e.g., psychographics), through efficient and continuous data analytics, to identify how customers can permanently incorporate energy efficiency into their business operations. No longer are energy efficiency programs passively offered when customers decide to participate. Now customers are actively pursued and encouraged to modify energy behaviors and to invest in the right energy efficiency upgrades at the right time, based on a coordinated set of program offerings, to improve the overall efficiency of their facilities.

In addition to proven program strategies, SoCalGas will incorporate new program strategies and corresponding program tactics to arrive at a complete EE solution set for the agricultural customer. Due to the multi-dimensional nature of the smaller agricultural customer, other program EE solutions will be offered to these unique customers through simplified program offerings. The proven and new program strategies are further detailed in the Program Intervention Strategies section. The new program approaches and the proposed implementation timeframe are summarized below:

Program Strategy	Program Tactic	Implementation Timing*
Partnering	Coordinated Industry Partnering	Near-term
Intelligent Outreach		
	Data Analytics	Near, mid-term
	Virtual Engagement	Near, mid-term
	Energy Management Technologies	Near-term
	Industry EE Best Practices	Near-term
	Small Agricultural Outreach	Near-term
Strategic Energy Management		Near-term
Customer Incentives		
	Pay-for-Performance	Near-term
	Bundled Measures	Near-term
Direct Install		
	Comprehensive Direct Install	Near-term

*Note: Near-term = 1-3 years; mid-term = 4-7 years; long-term = 8+ years.

3. Response To Sector Challenges

The agricultural sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engage the agricultural customer to achieve both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

- A considerable number of small agricultural customers lack technical and financial resources.
- The agricultural sector has competing priorities (i.e., crop yield and quality) that overshadows energy efficiency.

- A diverse agricultural sector base makes it difficult to offer programs that fit the needs of all customers to achieve comprehensive EE throughout all customer segments and sizes.

B. Market Characterization

SoCalGas services agricultural customers ranging from very small family farms to large commercial outfits, and include greenhouses, wineries, dairy farms, field crops, and more. The SoCalGas service territory encompasses the Lower San Joaquin Valley, Central Coast, and Southern California growing regions. Within this territory, SoCalGas has identified meaningful opportunities to change agricultural customer energy practices and behaviors to promote greater energy efficiency in agricultural segment-specific systems and processes.

The agricultural sector represents several unique customer segments that vary in size and type of operations. Emerging market trends in this sector represent the biggest potential for natural gas energy efficiency in the coming years. The key characteristics of the agricultural sector include:

- California’s agricultural sector is a \$54 billion industry that generates at least \$100 billion in related economic activity;
- Diverse and robust customer segments with each segment interlinked with the others in a network of common culture and commerce;
- Primary focus of the agricultural customers is on the health and yield of their crops;
- Small number of large customers who consume the vast majority of natural gas;
- Very large geographical area, typically in rural communities with limited access to EE products and services; and
- Low natural gas usage in many agricultural customer segments.

This section provides an overview of the agricultural market in the SoCalGas service territory with respect to farm size, segment type, annual energy use, energy savings, and remaining energy efficiency potential.

Agricultural Sector Segmentation by NAICS

Six North American Industry Classification System (NAICS) segments define the SoCalGas agricultural sector: Farming, Post-Harvest, Animal/Livestock, Greenhouses, Dairy, and Vineyards. Farming accounts represent the most common agricultural segment in the SoCalGas territory. This segment is loosely defined by the NAICS as crop production that does not fall into the more specific segments of Greenhouse or Vineyards.

SoCalGas agricultural customers are identified by NAICS codes that correspond to operations with crop or animal production, i.e., “farms.” Some of these customers may conduct on-site post-harvest processing, but any off-site food processing facilities are classified as an industrial account. SoCalGas categorizes customers within the agriculture sector by consumption, as revenue data for all agricultural customers are not available to the utility. Natural gas consumption is an imperfect indicator of farm size because larger agricultural outfits may not necessarily consume a proportionately large amount of natural gas. However, the large number of small agricultural customers by consumption mirrors the large number of small agricultural customers by revenue.

Agricultural Account Segmentation by Annual Usage

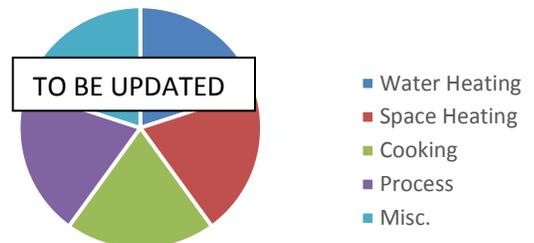
While some agricultural operations in the SoCalGas service territory are large, commercial-scale operations, many SoCalGas agricultural customers represent small farms. The United States Department of Agriculture uses a variety of classifications to distinguish among types and sizes of farms. One of the determining characteristics is revenue. Small and intermediate-sized farms are typically considered family and/or residential farms with annual revenues below \$250,000, whereas farms above this revenue threshold are considered commercial farms. According to an article from the University of California Agriculture Journal, more than 90% of California’s food and fiber is grown on roughly 19,000 nonresidential farms with revenues above \$100,000.¹ The rest is grown by approximately 62,000 small or residential farms. While the smaller farms may be overshadowed by the larger ones, their volume greatly impacts the rural economies in the state as they produce more than \$1 billion in annual sales, pay about 38% of agriculture’s property taxes, and own roughly one-third of the State’s farm machinery. These factors make small farms an important segment in California’s agriculture sector.

1. Customer Landscape

a. Natural Gas Consumption

Customer Size	2015 Number of Customers	2015 Usage MM Therms
Large	283	62,998,866
Small (<50k therms)	450	11,648,535
Micro (<12k therms)	1,283	2,743,457
Total	2,016	77,390,858

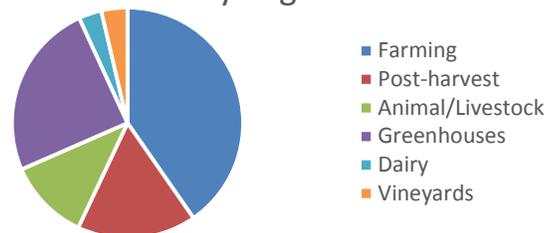
Figure 1.1: 2015 Agricultural Usage by End-Use



Agricultural Sector Energy Usage

In 2015, SoCalGas agriculture customers consumed about 78 million therms, as shown in Table B.1. The total agricultural sector usage represents about 1% of the total nonresidential customer load. Agricultural customers primarily use gas for space heating, greenhouse operations, animal comfort, and some water pumping, as shown in Figure 1.1. Natural gas consumption is highest in the farming, post-harvest and greenhouse segments, as shown in Figure 1.2.

Figure 1.2: 2015 Agricultural Usage by Segment

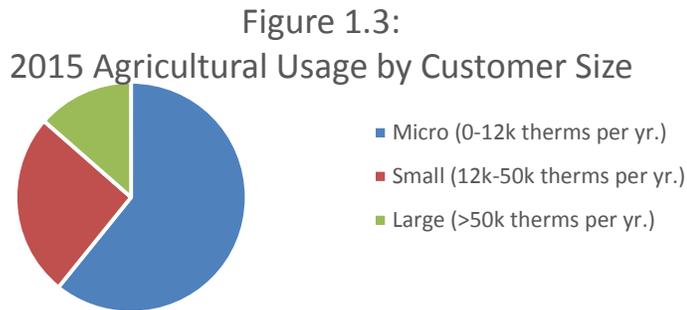


Usage By Customer Size

About 81% of natural gas consumed by SoCalGas’ agricultural customers is used by a few large accounts, while the vast majority of customers consume less than 50,000 therms of natural gas annually. Five customers use over one million therms annually, while approximately 450 of SoCalGas’ agricultural customers use between 12,000 – 50,000 therms annually. The majority of the agricultural customers (~1,283) consume less than 12,000 therms

¹ Add reference

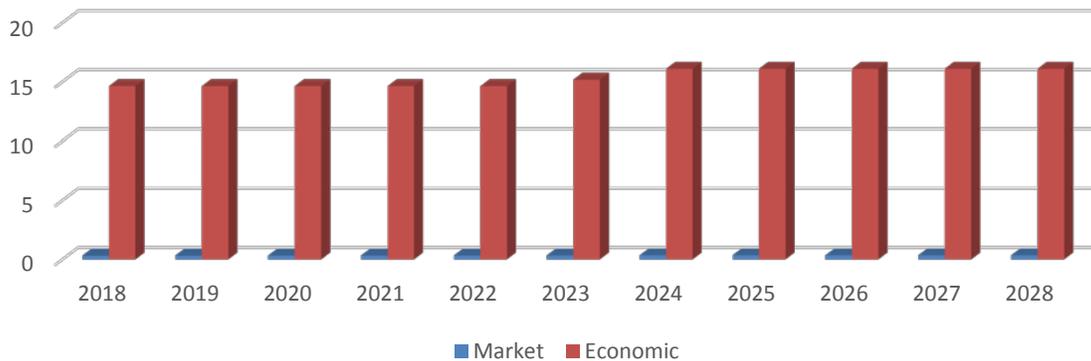
annually. Most of SoCalGas' agricultural customers fall into the Micro and Small categories as shown in Figure 1.3.



b. Market & Economic EE Potential

The estimated market and economic EE potential, by year, is shown in Figure 3.1. The SoCalGas agricultural sector gap analysis indicates that agricultural energy efficiency market and economic potential lies between 0.7 and 0.8 million therms annually from 2016 and 2024. Some specific areas identified as potential applications for EE program interventions include system-level solutions, such as system optimization services and water pumping as well as conveyance and drip irrigation. In addition to the measure and applications where there may be market potential, specific market sub-segments may be targets for energy efficiency programs in the coming years.

Figure 1.4: EE Potential - Agricultural - Market & Economic By Year

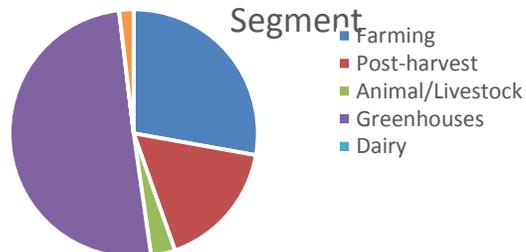


Historical Sector Performance

EE Savings by Segment

From 2010 to 2015, SoCalGas' agricultural sector saved 4.8 million therms of gas, representing about XX% of the overall energy savings of SoCalGas' energy efficiency portfolio. As shown in Figure 1.5, the greenhouse segment accounted for the largest portion of agricultural sector program EE savings representing a reduction of about 3.1% of agricultural sector gas usage. The farming (1.7%) and post-harvest (1%) segments also accounted for considerable energy savings during the same time period.

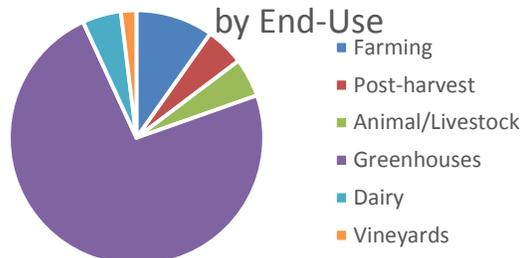
Figure 1.5: 2010-2015 Agricultural Energy Savings by Segment



EE Savings by End-Use

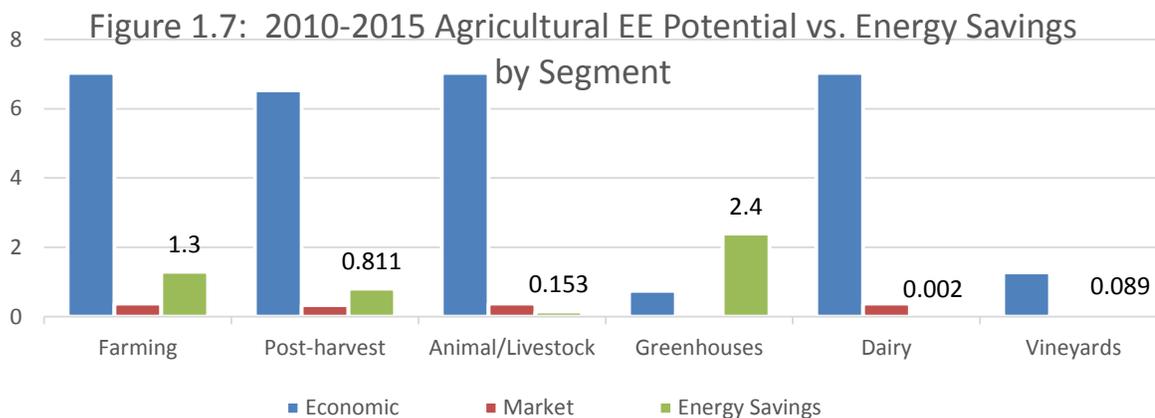
Figure 1.6 depicts the total energy savings from the agricultural sector by end use and by program. The process heating measures represented the largest energy savings by end use, followed closely by building envelope measures. The majority of agricultural energy efficiency savings results from the Custom-Calculated Incentives program.

Figure 1.6: 2010 - 2015 Agricultural Energy Savings by End-Use



Energy Efficiency Potential & Realized Energy Savings

A comparison of market potential with realized energy savings, by NAICS segment, is shown in Figure 1.7. The realized energy savings are greater than the market potential for the farming, greenhouse, and post-harvest segments while the realized energy savings are lower than the market potential in the animal/livestock segment. In contrast, dairy and vineyard segments show potential for energy savings, but still have low participation rates.



2. Market Intelligence

Energy Efficiency Equipment Sales Share

Due to the diverse segments within the agricultural sector, there is no common equipment used across the sector. However, similar equipment is common within each of the segments within the agricultural sector. Market adoption levels of EE equipment vary among segments and equipment. In the greenhouse segment, the primary EE equipment, heat curtain and infrared film, have achieved significant (~38%) market adoption levels. In contrast, the post-harvest segment uses the same measures EE equipment but market adoption levels are still very low (~1%).

In order to increase the purchase of EE equipment to realize the permanent market effect, SoCalGas will place a heavy focus on increasing market adoption of EE equipment where market adoption is low.

Key Market Actors

There are key market actors that can assist increasing market adoption of EE equipment by transforming the market through the various program and policy intervention strategies. The market actors include equipment vendors and manufacturers to assist in permanently modifying equipment stocking habits as well as customer perception and acceptance of EE equipment. Other market actors include influential industry associations and universities that can inform and influence specific-customer segments within the agricultural sector. With significant levels of regulation applied to this industry, partnering with various regulators to encourage deeper and more comprehensive EE will be needed.

3. Industry Trends

Key trends in the agricultural market within SoCalGas' service territory include:

Water. The agricultural sector faces significant water issues. Water availability is a very large concern for growers because of persistent drought conditions in California. Because of the limited water availability, there has been an increase in water pumping. As various segments use different water management approaches, energy management solutions can play an integral role in efficient use of energy and water.

Labor. The sector is experiencing a decreased labor supply and, as a result, an increase in labor costs. The increased labor costs severely limit the agricultural customer's ability to invest in more energy efficient equipment and processes.

Mechanization. Increases in labor costs and a reduced labor pool are moving the industry to more mechanized solutions. These trends will cause an increase in energy consumption and Greenhouse Gas (GHG) emissions. As various segments shift to automation and to different water management approaches, energy management solutions can play an integral role in reducing energy, water, and GHG impacts. In addition, various alternate fuel vehicle options may be well suited to meet the mechanization movement to help further mitigate and/or avoid GHG impacts.

Imported Crops. Imported crops are threatening many California commodities and can especially undermine smaller farms that cannot hedge low margins with the profits from vertically integrated operations. Working with smaller farmers to capture energy efficiency solutions will help their competitive positions. Increasing competition from international markets has created uncertainty in the market, and has caused some farms to be increasingly cost-conscious and risk averse. This is a current

concern in California's greenhouse and nursery segment as it is increasingly facing competition from other markets, particularly from South American growers.

Increased Energy Consumption. Although the agricultural sector represents about 5% of the natural gas load annually, there are current trends in various agricultural segments where increases in natural gas consumption are likely to occur. Among the varied agricultural segments, the industry continues to adapt in response to changes in crops, market demand, competition, technologies, production costs, and regulations. This means that energy efficiency programs must also be quick to adapt and adjust offerings and services to suit the needs of this market.

Urban² and Peri-Urban³ Farming. A number of sub-segments and technologies may present opportunities to introduce energy efficiency solutions within the agriculture market. New trends in farming, such as farm-to-table and urban or peri-urban farming place a high priority on local and sustainable produce, as well as community connections. For example, the greenhouse and nursery segments are an important and expanding component in California's agricultural market, and are the largest natural gas consumers within the agricultural sector. These trends create opportunities for significant water efficiency, GHG mitigation due to reduced transportation costs, and an increase in crop production and quality. Conversely, these trends will increase the energy intensity within these segments. Timely and effective EE program intervention strategies can significantly reduce the increases in energy consumed while creating an opportunity for farms to market themselves as "green" and sustainable as well as contributing to the well-being of the community.

Legalization. Another potential new sub-segment in California may be created by the potential approval of a regulated, legal marijuana system for adult recreational use at the state level. California's current medical marijuana legalization already represents about 50% of the legal cannabis market in the U.S.⁴ An examination of the fledgling marijuana industry will help identify energy efficiency opportunities. Partnering with industry associations (e.g., National Cannabis Industry Association) may help incorporate energy and water efficiency throughout the different agricultural processes (e.g., growing, harvesting, processing, etc.). However, continued conflict between state and federal laws regarding the legalization of marijuana will likely prohibit ratepayer-funded EE assistance for an industry not recognized at the federal level.

4. Sector Influences

a. Applicable Legislation and Regulatory Directives

There are a number of newly adopted legislative bills providing specific guidance for the future of energy efficiency in California. From Senate Bill (SB) 350 to Assembly Bills (AB) 793, 758 and 802, there are numerous directives that are helping to shape the next generation of energy efficiency program offerings. SB 350 sets forth a goal to double the levels of energy efficiency in California by 2030. With this goal set, a number of legislative and regulatory directives are provided to SoCalGas, and other program administrators, to help shape the energy efficiency business plans. The CPUC has also issued

² Refers to small areas (e.g. vacant plots, gardens, verges, balconies, containers) within the city for growing crops and raising small livestock or milk cows for own-consumption or sale in neighborhood markets.

³ Refers to farm units close to town which operate intensive semi- or fully commercial farms to grow vegetables and other horticulture, raise poultry and other livestock, and produce milk and eggs.

⁴ Top 5 States to Watch in 2016, National Cannabis Industry Association, November 2015.

guidance to program administrators on how to further formulate the energy efficiency business plans. In response, SoCalGas has reshaped existing program strategies and added new ones to meet these specific legislative directives. A summary of the recent legislative and regulatory directives along with SoCalGas' proposed program strategies to address these directives are detailed in Appendix B.

b. EM&V Study Recommendations & Observations

The evaluation, measurement, and verification (EM&V) process includes a number of agricultural sector-related market studies, load impact, programs, process evaluations, and potential studies on energy efficiency programs and market segments.

The agricultural sector business plan incorporates, with and without modifications, various recommendations that have not already been incorporated into the existing energy efficiency programs. A list of referenced EM&V studies directed at the agricultural sector is provided in Appendix C of this business plan chapter.

c. External Stakeholder Input

As part of the EE business planning process, SoCalGas received valuable input from various external stakeholders primarily through the California Energy Efficiency Coordinating Committee (CAEECC). The stakeholder input, in part, helped shape the program strategies offered in the business plan. Specific CAEECC recommendations and corresponding responses are shown in Appendix D of this business plan.

C. Vision, Goals, Objectives, and Sector Strategies

The agricultural sector vision, goals and objectives set the tone and direction for the next generation of program offerings. It is vitally important that they are clear, concise and connected to California's overall energy efficiency vision. The agricultural sector business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape the agricultural sector vision. The business plan has a number of other influences including: Commission policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input and program experience.

The agricultural sector goals and objectives were borne from the energy efficiency business planning efforts and reflect the areas of focus needed to achieve the sector vision. In addition, sector-specific tactical objectives are provided to set clear and tangible tasks that support the sector goals and objectives. Over time, the goals and corresponding objectives may be reset to adapt to changes in the agricultural sector, regulatory policies, laws, and customer response to program offerings.

1. Agricultural Sector Vision

Energy efficiency will support the long-term economic and environmental success of California agriculture.

2. Agricultural Sector Goals

- Substantial increase in deeper, comprehensive natural gas energy efficiency in the small customer groups.
- Increased customer acceptance of the natural gas EE value proposition.
- Increase in natural gas energy efficiency among all agricultural customer segments.

3. Agricultural Sector Objectives

- Identify customer facilities with the high EE potential to achieve substantial increase in deeper, comprehensive natural gas energy efficiency within the small-sized agricultural group.
- Promote EE benefits to achieve greater customer acceptance of the natural gas EE value proposition.
- Create a simple, easy program engagement to achieve significant increases in the efficiency natural gas use by all customer segments.

4. Agricultural Sector Tactical Objectives

- i. Within the context of expanding production, provide energy efficiency education/outreach in support of EE equipment to growers and vendors as they begin to expand production and add equipment.
- ii. Simplify program requirements to facilitate ease of program participation while maintaining appropriate safeguards.
- iii. Promote a full range of measures to sector, as part of an integrated program (residential, commercial, and agricultural) rather than focus solely on agricultural processes.
- iv. Partner with University of California's Cooperative Extension Service, industry associations, and equipment vendors to promote EE equipment, process, and programs to various segments (e.g., fruit and nut trees).
- v. Develop segment-specific energy metrics (and corresponding benchmarks) as part of growers' overall sustainability efforts, in collaboration with industry associations, to promote energy efficiency (e.g., mushroom growers).
- vi. In the greenhouse segment, demonstrate and promote EE that includes efficient equipment as well as energy management systems.
- vii. Educate growers regarding life-cycle costing and energy efficient equipment purchases in response to sector movement towards mechanization of agricultural processes. Also, inform customers on options for alternate fuel vehicles to help mitigate future GHG emissions.
- viii. Educate agricultural customer on energy and operational benefits and encourage customers to adopt EE equipment and O&M actions to increase measurable energy efficiency.
- ix. Create industry benchmarks for individual segments (industry type, customer size) to inform and demonstrate EE benefits to customer segment.
- x. Create data analytic methods to efficiently identify facilities with higher EE potential and provide tailored energy assessment to lead customer to make permanent EE behavioral changes and to promote EE equipment purchases.
- xi. Train agricultural customer to develop permanent EE practices, improved agricultural process efficiency and on-going benchmarking monitoring.
- xii. Collaborate with industry to identify emerging and renewed EE technologies and to increase adoption levels of those EE technologies.
- xiii. Collaborate with financial market actors to enhance financing options for small agricultural customers and to promote existing financing vehicles available to the agricultural sector.

D. Program Intervention Strategies & Delivery

Since the 1990s, California has embraced the notion that energy efficiency program intervention strategies, coupled with government intervention strategies (e.g., public policies and laws), can permanently reduce market barriers so customers can achieve higher levels of energy efficiency. In a transformed market, customers will naturally adopt higher levels of energy efficiency without the need for such program and government interventions. All programs, resource and non-resource, contribute, in some way, to reducing market barriers in order to achieve the desired, long-lasting market effects.⁵ The current CPUC market transformation definition is stated below:

“Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.”⁶

To identify the appropriate program strategies, the business plan identifies sector-specific problem statements with corresponding resolutions or desired outcomes. Sector-specific program strategies are presented that will reduce current market barriers. Program delivery will rely on a combination of third party delivered statewide and local programs. These programs will be supplemented with SoCalGas support that will enable third party program implementers and customers to work together on energy efficiency solutions. The business plan also identifies key sector-level metrics that will track the on-going progress towards achieving the desired outcomes for the program administrator and regulator, as presented below.

1. Problem Statements & Market Barriers

a. Problem Statements

The agricultural sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engage the agricultural customer to achieve both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

1. A considerable number of small agricultural customers lack technical and financial resources.
2. The agriculture sector has competing priorities (i.e., production and product quality) which overshadow energy efficient investment opportunities.
3. A diverse agricultural sector base makes it difficult to offer standard programs that fit the needs of all customers within and among segments.

⁵ “Market transformation is not a label that uniquely identifies certain energy efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees.” [A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel]

⁶ D.09-09-047, pp. 88-89.

b. Market Barriers

There are several market barriers present within the same market that inhibit the customer from achieving higher levels of energy efficiency. Market barriers are a byproduct of the market sector characteristics and the customer’s behavior within that specific market sector. Program strategies are temporary interventions introduced into the market sector to reduce these market barriers to create real, lasting market changes.

The following are perceived market barriers, specific to the agricultural sector, identified during the business planning process. Specific examples related to each market barrier are provided.

Table D.1: Perceived Market Barriers	
Organizational practices or customs	<p>Drought and dwindling water supply a large concern. The dwindling water supply has caused the food production, based on harvested acreage, to decline. In 2014, harvested acreage was 6.9 million acres, the lowest level in the past 15 years. When faced with declining production, agricultural customers may be less inclined to prioritize energy efficiency over other investments that have the potential to boost production. Specific to wineries, the current multi-year drought in California made it increasingly difficult to make business cases to obtain capital allocation for energy reduction projects, with higher prioritization placed on water and irrigation projects.</p>
	<p>Seasonality. Farmers must consider production seasons. Seasonality is a characteristic that affects savings for agricultural customers. For some agricultural customers, such as the fruits and vegetable canning industry, savings can only occur during the facility’s operating season. Furthermore, agricultural customers may be extremely time-constrained during the planting or harvesting seasons to plan and implement EE solutions.</p>
High first cost (liquidity constraint)	<p>Capital investments strain even large farms. Although large farms tend to have more capital to invest in efficiency opportunities than small farms do, the volume of equipment that large farms must replace can place cost constraints on their efficiency efforts, as well. This makes energy efficiency difficult to prioritize.</p>
	<p>Energy efficiency not a priority for small farms. While agricultural customers consider water and energy efficiency to an extent, the primary concern is the health and yield of their crops. Agricultural customers may select equipment based on the needs of the crop they are growing and thus will forgo systems that are more efficient because of the crop’s needs. For example, a rice grower requires high amounts of water and thus will continue to use flood irrigation practices as low flow systems may hurt the crop or decrease the farmer’s yield. Specific to wineries, the current drought in California has made it difficult to make it cost beneficial to allocate capital for energy efficiency projects. Water and irrigation projects are higher priorities. This issue affects all agricultural customers to some extent, but may be especially challenging for small farms given their already-constrained resources. Small farms are also particularly affected by the burdens of regulatory compliance.</p>
	<p>Rising costs and competition. Rising costs and competition threaten small farm success. Rising production costs and increased competition from larger farms and from imported crops threaten small farm viability. Production costs including equipment costs, inputs, and regulatory compliance, can be higher for small operations that do not have the advantage of the economies of scale. Additionally, imported crops are threatening many California commodities and can especially undermine smaller farms that cannot hedge low margins with the profits from vertically integrated operations.</p>
Diffused Market	<p>Agricultural customer energy use varies greatly. The agricultural sector customers are very diverse in their business operations and how they</p>

	use natural gas. The customer diversity creates challenges to positioning gas EE in the market as customer perceptions and energy usage vary greatly.
Information or search costs	Integrated farms. Some agricultural facilities integrate agricultural, commercial and residential activities. For example, the integrated nature of agricultural, commercial, and residential activities within fruit, tree nut, and vine crop operations lends itself to a program design that can offer measures for all three types of energy profiles. Therefore, energy efficiency programs may need to address a wide variety of end uses and consumption patterns from a single source.
	Competing priorities. Production and quality are the highest priority for agricultural customers. While they consider water and energy efficiency to an extent, their concern is the health and yield of their crops. Agricultural customers will select equipment based on the needs of the crop that they are growing. This may mean that agricultural customers will forgo systems that are more efficient because the crop requires more water to grow, and may not prioritize the efficiency of the equipment when considering purchases.
	No holistic approach to efficiency. While individual energy efficient equipment may help to manage costs, many growing systems for agricultural customers are complex and may not benefit from limited optimization of individual elements. By offering agricultural energy audits and designing a systems approach to agricultural incentives, utilities have an opportunity to overcome both the barriers of first cost while promoting a holistic approach to energy savings.
	Limited sharing of energy efficiency information. Unlike other nonresidential sectors, the customers within various agricultural segments have a natural connection to each other and most agricultural segments have very well established industry associations. However, there is still limited information regarding energy efficiency opportunities shared through many of these industry stakeholders. Greater levels of engagement, such as partnering, with key industry stakeholder groups can be very influential upon the customer’s energy efficient behaviors and decision-making.
	Program complexity Inhibits EE. Micro/small customers tend not to pursue energy efficiency due to the complexity of the EE upgrades.
Performance uncertainties	Low natural gas costs deter large investments in EE. Micro/small customers tend not to pursue energy efficiency due to the limited gas bill savings.
	Limited cost-effective EE technologies inhibit customer action. There are few cost-effective EE measures available to agricultural customers. Greater focus on the technology needs of the various customer segments is needed.
	Lack of comprehensive industry-specific information. Despite individual reports that various groups have conducted over the years, the agricultural industry still lacks a comprehensive database of individual producers in the market, and their respective on-farm equipment components. The lack of a comprehensive database makes it difficult to establish industry baselines, to identify market trends, and to maintain communication with agricultural customers.
	Behavioral energy savings are not recognized. There are several low to no-cost EE behavioral measures including operations and maintenance (O&M) improvements where the EE savings are not recognized by current CPUC policies.
Bounded rationality	Movement towards mechanization. Because of decreased labor supply and increased labor costs, farms may need to improve labor efficiency by increasing mechanization. Research into mechanized equipment and increased communication with agricultural customers provide the opportunity to influence equipment choice and promote alternate fuel vehicles if a customer transitions to more automated processes.

Access to financing	Financing can be a challenge. Small agricultural customers have very little natural gas energy efficiency potential. The small size of the investment may not meet or exceed current financing thresholds (e.g., on-bill financing requires a \$5,000 minimum loan amount due to California lending laws).
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2. Desired Sector Outcome

A market effect is a permanent change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).⁷ The sector business plan identifies key milestones in the advancement towards a permanent market effect through a set of desired sector outcomes. In many cases, the desired outcome is expected well beyond the near and mid-term planning horizons, and ties to the 10-year vision for the sector. The business plan identifies the corresponding program intervention strategies that will be deployed to reduce the market barriers, which will result in the desired sector outcome.

Table D.2: Market Sector Overview: Agricultural Sector				
Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
A considerable number of small agricultural customers lack technical and financial resources.	High adoption of deeper, comprehensive natural gas EE savings for smaller customers.	Substantial increase in deeper, comprehensive natural gas EE savings from smaller-sized customers.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Agricultural Outreach • Customer Incentives • Direct Install • Midstream EE Equipment • Agricultural Financing • Emerging Tech. 	Increase in EE savings achieved in smaller-sized (<50k therms) customer group.
The agricultural sector has competing priorities, which may overshadow energy efficiency.	High customer adoption of EE value proposition.	Increase customer acceptance of the natural gas EE value proposition.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Agricultural Outreach • Strategic Energy Mgmt. • Customer Incentives • Direct Install • Midstream EE Equipment • Agricultural Financing • Emerging Tech. 	Increase in number of customers participating in EE programs.
A diverse agricultural sector base makes it difficult to offer programs that fit the needs of all	High adoption of EE among all agricultural segments.	Substantial increase in natural gas EE savings among all agricultural segments.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Agricultural Outreach • Strategic Energy Mgmt. • Customer Incentives 	Increase in EE savings achieved from all agricultural segments, including smaller-

⁷ A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel, p. 9

Table D.2: Market Sector Overview: Agricultural Sector

Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
customers.			<ul style="list-style-type: none"> • Direct Install • Midstream EE Equipment • Agricultural Financing • Emerging Tech. 	sized customers.

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Figure 1: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME: Substantial increase in deeper, comprehensive natural gas EE savings from smaller-sized customers.</p>	<p>High First Cost: Capital investments strain even large farms. Energy efficiency not a priority for small farms. Rising costs and competition.</p>	<ul style="list-style-type: none"> Customer incentives Direct Install Midstream EE Equipment Strategic Energy Management Financing
	<p>Information Cost: Integrated farms reflect multiple customer types. Competing priorities. No holistic approach to efficiency. Limited sharing among industry. Complexity.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Business Outreach
	<p>Diffused Market: Agricultural customer energy use varies greatly.</p>	<ul style="list-style-type: none"> Partnering Intelligent Outreach Small Ag Outreach
	<p>Bounded Rationality: Movement towards mechanization.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Ag Outreach ET Promotion
	<p>Organizational Practices: Drought and dwindling water supply a large concern. Seasonality.</p>	<ul style="list-style-type: none"> Strategic Energy Management Partnering Intelligent Outreach
	<p>Performance Uncertainties: Low natural gas costs deter large investments in EE. Limited cost-effective EE technologies inhibit customer action. Lack of industry-specific information.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Business Outreach
	<p>Access to Financing: Financing can be a challenge as smaller customers of very little EE potential.</p>	<ul style="list-style-type: none"> Customer Incentives Direct Install EE Equipment Midstream Agricultural Financing

Figure 2: Market Barriers & Program Intervention Strategies



Figure 3: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME: Substantial increase in natural gas EE savings among all agricultural segments.</p>	<p>High First Cost: Capital investments strain even large farms. Energy efficiency not a priority for small farms. Rising costs and competition.</p>	<ul style="list-style-type: none"> Customer incentives Direct Install Midstream EE Equipment Strategic Energy Management Financing
	<p>Organizational Practices: Drought and dwindling water supply a large concern. Seasonality.</p>	<ul style="list-style-type: none"> Strategic Energy Management Partnering Intelligent Outreach
	<p>Diffused Market: Agricultural customer energy use varies greatly.</p>	<ul style="list-style-type: none"> Partnering Intelligent Outreach Small Ag Outreach
	<p>Information Cost: Integrated farms reflect multiple customer types. Competing priorities. No holistic approach to efficiency. Limited sharing among industry. Complexity.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Ag Outreach
	<p>Performance Uncertainties: Low natural gas costs deter large investments in EE. Limited cost-effective EE technologies inhibit customer action. Lack of industry-specific information.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Ag Outreach

3. Program Intervention Strategies

To realize the desired sector outcomes, several coordinated and integrated program intervention strategies will be deployed throughout the various market channels to increase customer EE adoption levels. This will support the achievement of increases in the adoption of EE products and behavioral practices. The expected outcome, corresponding sector metric, market barriers, and program intervention strategies are summarized below and grouped by the sector's problem statements. A detailed description of each program strategy follows these summaries.

Agricultural sector represents several unique customer segments that vary in size and type of operations. Emerging market trends in this sector represents the biggest potential for natural gas energy efficiency in the coming years. The key characteristics of the agricultural sector include:

- California's agriculture sector is a \$54 billion industry that generates at least \$100 billion in related economic activity;
- Diverse and robust customer segments with each segment interlinked with the others in a network of common culture and commerce;
- Primary focus of the agricultural customers is on the health and yield of their crops;
- Small number of large customers who consume the vast majority of natural gas;
- Very large geographical area typically in rural communities with limited access to EE products and services; and
- Natural gas usage is low in many agricultural customer segments.

Due to the limited natural gas usage among customers within this sector and the need to simplify customer engagement in the delivery of DSM programs, SoCalGas proposes to coordinate program delivery with other local utilities (electric, water), where practicable. This will allow for a single, simple customer engagement and will empower the customer to implement a holistic energy (and water) efficiency plan.

In certain instances, a customer may behave in manner similar to those in other sectors. For example, an agricultural customer may also act as a residential and commercial customer in a shared facility depending on the varied growing seasons. In those instances, strategies from various sectors will be offered to these multi-dimensional customers in a coordinated approach.

The following is a comprehensive list of program intervention strategies that will be directed at SoCalGas' agricultural customer sector. The strategies are intended to overcome the various market barriers identified in this business plan to achieve permanent market outcomes. These strategies will be deployed in a cohesive manner at various stages during the execution of the business plan. The program strategies presented in this business plan will likely be supplemented with additional program strategies provided by the creative and innovative third-party EE provider community through competitive program solicitations held throughout the implementation of the business plan.

Upon Commission approval of this business plan, future implementation plans will be presented describing the tactical approaches to implementing these program intervention strategies based on the results of programs solicitations conducted in support of this business plan. Overall, the program intervention strategies are intended to:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services;
- Cultivate, promote and sustain lasting energy-efficient operations and practices; and
- Meet customers’ energy efficiency adoption preferences through a range of simplified offerings that address the customer’s energy efficiency needs.

Table D.3: Summary - Program Interventions Strategies Across Customer Size

Intervention Strategies	Status	Micro	Small	Medium	Large
Partnering					
• Utility Partners	New	X	X	X	X
• Industry Partners	New	X	X	X	X
Intelligent Outreach					
• Data Analytics	New	X	X	X	X
• Virtual Engagement	New	X	X	X	X
• Facility Energy Advisor	Existing	X	X	X	X
• Energy Management Technology	New	X	X	X	X
• Industry EE Best Practices	New	X	X	X	X
Small Agricultural Outreach	New	X	X	X	X
Technical Assistance	New	X	X	X	X
Strategic Energy Management	New			X	X
Customer Incentives					
• Pay-for-Performance	New		X	X	X
• Customized Incentives	Existing		X	X	X
• Deemed Incentives	Existing	X	X	X	X
• Bundled Measures	Existing	X	X	X	X
• Whole Building	Existing	X	X	X	X
Direct Install					
• Direct Install	New	X	X	X	
• Comprehensive DI	New	X	X	X	
Midstream EE Equipment	New	X	X	X	X
Agricultural Financing	Existing	X	X	X	X
Innovative Design	Existing	X	X	X	X
Crosscutting Coordination					
• Emerging Technologies	Existing	X	X	X	X
• Workforce Education Training	Existing	X	X	X	X
• Codes & Standards	Existing	X	X	X	X

Table D.4: Program Intervention Strategies Descriptions

Program Strategy	Status	Type	Timing	Program Strategies Descriptions
Partnering				Limited-partnership arrangements, deployed on an as needed basis that is intended to: increase the number of customers adopting EE; promote deeper, comprehensive EE; simplify customer engagement; and reduce program costs through a cost-sharing partner model based on equitably sharing of customer incentives and administrative costs among partners.
• Utility Partnering	New	NR	Near, Mid-term	Facilitate the co-delivery of key program intervention strategies among gas and electric investor-owned utilities, publicly-owned utilities, program administrators, and water agencies.
• Industry Partnering	New	NR	Near, Mid-term	Partnering will also be deployed, on an as needed-basis, among industry associations, universities, etc. to promote EE solutions to a represented customer group.
Intelligent Outreach				To assist customers in identifying the greatest EE opportunities, improve cost efficiency in program delivery, segment-specific benchmarking and provide deeper, comprehensive energy savings solutions.
• Data Analytics	New	NR	Near, Mid-term	Leverage AMI data to quickly and efficiently target facilities with the highest EE potential for customer. This will assist in encouraging the uninterested customer with the opportunity for immediate and direct financial benefits by incorporating energy efficiency into their operations. Benchmarking by segment and size will be a key element to this strategy.
• Virtual Energy Audits	New	R	Near, Mid-term	As a result of data analytics, energy audits will be able to recommend both optimization and operations and maintenance (O&M) measures to customer decision-makers. O&M and optimization EE opportunities will be presented to facility staff to implement for immediate and persistent energy savings along with necessary training and education to permanently change the customer’s behavior. Consumer-friendly, on-going communication to inform the customer on their progress in maintaining and/or increasing EE levels within their facilities will be a permanent feature.

Table D.4: Program Intervention Strategies Descriptions

Program Strategy	Status	Type	Timing	Program Strategies Descriptions
<ul style="list-style-type: none"> • Facility Energy Audits 	Existing	R	Near-term	Offers onsite comprehensive assessments to identify EE opportunities and traditional data driven interactive tools designed to engage and motivate customers to reduce their energy consumption through customized program recommendations.
<ul style="list-style-type: none"> • Energy Management Technology 	New	R	Near-term	Leverages emerging management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and management technologies to permanently modify customer behavior which will result in reliable energy efficiency savings. These technologies will also focus on appliances that can assist the customer to manage their energy including proper equipment maintenance (e.g., HVAC self-diagnostic technology) to achieve optimal efficiency. Where practicable, the strategy will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency experience.
<ul style="list-style-type: none"> • Industry EE best Practices 	New	NR	Near, mid-term	Offer, along with segment industry groups, a collaborative forum to help inform, excite and accelerate EE actions among like customers.

Table D.4: Program Intervention Strategies Descriptions

Program Strategy	Status	Type	Timing	Program Strategies Descriptions
Small Agricultural Outreach	New	NR	Near-term	Target small-sized customers by applying data analytics, including a focus on rural and non-English speaking business owners, to help the customer understand how specific energy efficiency equipment retrofits, O&M, and optimization EE changes, based on their own unique energy usage profile, can improve their agricultural operations. The agricultural customers either use natural gas as part of their agricultural process (larger consumer) or not (small consumer). The small agricultural outreach tactic, in concert with the data analytics tactic, will group these customers accordingly and approach them differently. The larger consuming agricultural customers will be approached with similar program strategies along with a more comprehensive direct install offering. The lower energy-consuming customers typically use natural gas as a small commercial and/or residential customer (e.g., water and space heating). As such, the appropriate commercial and/or residential program strategies will be directed at these lower energy-consuming customers.
Technical Assistance	Existing	NR	Near-term	Technical assistance is an information strategy focused on educating and training key facility personnel on EE practices and providing supplemental technical assistance in EE project development and implementation.
Strategic Energy Management (SEM)	New			SEM is a proven program intervention strategy achieving deeper and permanent energy efficiency levels for larger operations in the agricultural sector through improved customer operations and maintenance practices and EE equipment installations. SEM provides long-term consulting services for educating and training participating businesses' staff to do the following: (1) develop and implement a long-term energy planning strategy; and (2) permanently integrate energy management into their business planning at all organizational levels, from the shop floor to corporate management.

Table D.4: Program Intervention Strategies Descriptions

Program Strategy	Status	Type	Timing	Program Strategies Descriptions
Customer Incentives				<p>Facilitates customer choice by offering a <u>simplified</u> suite of financial incentives strategies to customers (and/or their ESCO) to reduce the high first cost barrier, the key market barrier for most customers. Although incentive-based strategies like pay-for-performance appeal to larger EE projects, in many circumstances, the deemed and customized incentive one-payment strategies are very effective in motivating the customer to install EE equipment. The following strategies will be offered in combination with other program strategies to encourage deeper, more comprehensive energy efficiency solutions and permanent EE behavior modification.</p>
<ul style="list-style-type: none"> • Pay-for-Performance 	New	R	Near-term	<p>Targets more comprehensive EE projects. Customers will be encouraged to work with ESCOs, if needed, to participate in a pay-for-performance (P4P) strategy. The P4P strategy will provide for incentive payments to the participating customer over a pre-determined time period on preset payment intervals based on measured savings, using normalized meter data, with a baseline of existing conditions associated with O&M and behavioral actions and equipment retrofits.</p>
<ul style="list-style-type: none"> • Customized Incentives 	Existing	R	Near-term	<p>Offers financial incentives for customized retrofit EE projects, including new construction. The program offering features incentives based on calculated energy savings for measures installed as recommended by comprehensive technical and design assistance for customized retrofits and new construction. It offers a calculation method that can consider system and resource interactions, to support an integrated, whole system, and multi-resource management strategies.</p>
<ul style="list-style-type: none"> • Deemed Incentive 	Existing	R	Near-term	<p>Offers financial incentives based on predetermined energy savings. It also features rebates per unit measure for installed energy-saving projects and provides the IOU, equipment vendors, and customers a simple transaction and encourages greater market adoption of emerging EE technologies and applications.</p>

Table D.4: Program Intervention Strategies Descriptions

Program Strategy	Status	Type	Timing	Program Strategies Descriptions
<ul style="list-style-type: none"> • Small agricultural bundled measures 	Existing	R	Near-term	Provides an integrated approach, bundling various measures together to provide an all-inclusive solution to the customer-based profile (segment, size, energy usage) primarily for small/medium-sized customers. The bundled strategy will integrate education, financing, and technical assistance in support of the installation of EE measures.
<ul style="list-style-type: none"> • Whole Building 	Existing	R	Near-term	A process that views the building as a system, rather than collection of components, in which each system interacts with each other systems such as HVAC, the building envelope, and lighting. This strategy is also directed at the new construction segment by promoting integrated design through owner incentives, design team incentives, and design assistance to participants who design spaces that are energy efficient.
<p>Direct Install</p>				<p>Offers a standard direct install (DI) strategy targeted primarily at small/medium-sized customers that will deliver natural gas energy efficiency solutions, with electric and water efficiency, where feasible, to achieve near-term measurable results. A comprehensive direct install (CDI) tactic will extend beyond the standard DI offering achieve deeper, more comprehensive EE equipment retrofits. CDI will rely, in part, on ratepayer funds and leverage customer co-fund contributions and/or customer financing.</p>
<ul style="list-style-type: none"> • Standard Direct Install 	New	R	Near-term	Targets small/medium-sized customers by leveraging the intelligent outreach strategy that will identify facilities with the greatest EE opportunity. The standard direct install offering will provide limited list of low/no cost EE measures. DI will install natural gas EE measures along with other similar electric and water efficiency measures, where practicable.

Table D.4: Program Intervention Strategies Descriptions

Program Strategy	Status	Type	Timing	Program Strategies Descriptions
<ul style="list-style-type: none"> • Comprehensive Direct Install 	New	R	Near-term	Encourages deeper energy savings by offering more comprehensive EE measures than are typically used by the targeted customer segment. CDI will provider qualified contractors that will engage directly with the customers to install measures. A co-pay option will be offered to the customer along with a tailored on-bill repayment strategy to offset the initial cost of the EE equipment.
Midstream EE Equipment	Existing	R	Near-term	Provides deemed incentives to manufactures and distributors that will be used to reduce the retail cost of natural gas EE equipment (e.g., tankless water heating). This offering will be coupled with a comprehensive, co-pay direct install strategy that can effectively deliver on-demand installation by trained and qualified contractors.
Agricultural Financing	Existing	NR	Near-, Mid-term	Relies upon various financing vehicles, including on/off bill repayment solutions, to encourage customers to adopt deeper, more comprehensive energy efficiency solutions. For smaller customers, financing solutions will be encouraged to offset customer’s financial contribution (e.g., co-pay) for an EE retrofit, such as comprehensive direct install, to overcome customer financial barriers. Due to unique set of non-ratepayer funded loan subsidies, the strategy will provide customer assistance in identifying optimal loan(s) for EE upgrades opportunities.
Innovative Design	Existing	R	Near-, Mid-term	Will solicit for large budget program designs to reach deeper levels of energy efficiency in various segments within the sector. The solicitations will be continuously offered through the Innovative Design for Energy Efficiency Application (IDEA365) solicitation in search of ways to capture EE savings in various segments within the sector.
Crosscutting				
Emerging Technology Introduction				Actively introduce EE technology solutions that will be applicable to the customer sector and achieve customer adoption including a focus on technologies that can be used by agricultural customers.

Table D.4: Program Intervention Strategies Descriptions				
Program Strategy	Status	Type	Timing	Program Strategies Descriptions
• Scaled Field Placement	Existing	R	Near, Mid-term	Deliver scaled field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable customers.
• Demonstration Field Placement	Existing	NR	Near, Mid-term	Conduct selective demonstration field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable customers.
Workforce Education & Training (WE&T)	Existing	NR	Near, Mid-term	WE&T will provide classes, seminars, consultations, and demonstrations to support agricultural customer and contractor training and awareness of EE technologies, quality installation, and code compliance.
Codes & Standards	Existing	NR	Near, Mid-term	C&S will work with the agricultural sector customers and contractor community to increase awareness of new codes and to support code compliance, where applicable.

Note: R=Resource; NR = Non-resource. Near-term = 1-3 years; mid-term = 4-7 years; long-term = 8+ years.

4. Program Delivery

Individual programs will be designed and delivered by third party providers and SoCalGas based upon the program intervention strategies presented in the agricultural sector business plan. Some programs may be designed and delivered through a statewide program implementer under contract with a lead program administrator. Other programs may be designed and delivered by third party implementers at a local or regional level. In some cases, SoCalGas will leverage its natural position with its customer to effectively deliver programs. In addition, SoCalGas will support the program delivery by leveraging existing resources (customer account representatives) to assist the customer and third-party program implementer in the identification and implementation of specific customer projects. During the transition to new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market for a limited time. The approach will minimize program disruption and avoid funding hiatus for ongoing program efforts.

a. Statewide Implementation

SoCalGas will collaborate and coordinate with other program administrators on the effective implementation of any statewide program offerings. Programs designed to engage directly with specific market actors at the midstream and upstream market channels will be implemented on a statewide basis. Other downstream programs, beyond what is presented in the business plan, may also be considered candidates for statewide implementation throughout the duration of the business plan.

b. Third Party Implementation

Local and regional solutions are necessary for the achievement of the agricultural sector vision, goals and objectives. Many of the current programs offered are done so in coordination with publicly-owned utilities (POUs). Such partnerships with POUs will continue at a local level. For example, SoCalGas has a strong partnership with the Los Angeles Department of Water and Power (LADWP), the largest municipality in the nation, to jointly design and deliver EE programs to a shared customer base. Such activities will continue either implemented by the POU and/or implemented by SoCalGas selected and managed third party program implementers. SoCalGas will also work with other POUs to identify good program candidates to join the statewide implementation efforts, where feasible.

c. IOU Program Implementation and Support

SoCalGas proposes to continue implementation of certain downstream programs (i.e., programs delivered directly to the customer) where it is reasonable and practicable to do so. SoCalGas will also continue to actively support the delivery of third-party programs. For example, customer services, such as incentive payments and inspections, will be provided by SoCalGas to support third-party program implementers and to safeguard ratepayer funds. For program efficiency, the customers will also be directed to the SoCalGas portal to maintain a simple, easy program participation experience for the customer. In addition, at times, it is more efficient and productive to leverage the natural relationship between SoCalGas and its customers. As the trusted energy advisor, SoCalGas' has an ongoing relationship with its customers on all energy matters including energy efficiency. SoCalGas proposes to continue to promote energy efficiency programs to the customers and customer groups in order to improve the likelihood that customers will adopt energy efficiency.

5. Performance Sector Metrics

To gauge sector progress towards the achievement of the desired sector outcomes, the business plan proposes key sector metrics. To properly monitor progress, the metrics will rely on data currently collected, tracked, and verified as part of the program administrator's data requirements (e.g., energy savings, customer participation, etc.). This approach improves the accuracy and timeliness of metric tracking while keeping the monitoring costs to reasonable levels. The agricultural sector metrics associated with each problem statement are provided in Appendix A.

6. Key Partners

The success of the agricultural sector business plan will rely on a positive, collaborative relationship with a number of market actors, program administrators, regulators and other government entities. Below is a list of key partners that will help SoCalGas successfully achieve the ambitious vision for the agricultural sector.

Table D.5: Key Partners	
Key Partners	Support Activity
Program Administrators	<ul style="list-style-type: none"> • Deliver dual-fuel programs to reach more customers; • Leverage all available best practices and promote statewide consistency, where appropriate; • Simplify program engagement; • Capture all energy efficiency benefits including operational energy savings; and • Conduct market research that will identify and better understand unique barriers to energy efficiency investments.
Publicly-owned Utilities (POUs) and Water Districts	SoCalGas will actively coordinate with POUs and water agencies to effectively and efficiently deliver energy and water efficiency programs. SoCalGas will engage in partnership and co-delivery arrangements with POUs and water agencies when there is a shared customer base (gas, electric) to simplify the customer engagement and achieve higher levels of EE. SoCalGas will actively coordinate with POUs and water agencies throughout California and other regions to share best practices in program administration, design and delivery.
State and federal agencies	SoCalGas will work with state federal agencies (e.g., DFA, DWR, USDA) to promote greater levels of EE adoption throughout the various agricultural segments.
California Public Utilities Commission and Key Stakeholders	SoCalGas will work with the Commission and other key stakeholder to investigate ways to simplify program requirements and to identify policies that will recognize all energy efficiency benefits associated with agricultural sector EE programs.
Third-party Program Implementers	Solicit new and innovative programs from third-party program implementers to address the agricultural sector. Leveraging third party programs allows program administrators to draw upon creative program solutions that can be quickly and effectively targeted to these customers. Continued collaboration with program implementers throughout the program’s lifecycle will be an integral part of the program’s success.
Rural Hard to Reach Working Group	SoCalGas will leverage its existing relationship with the Rural Hard to Reach Working group to assist in efforts with industry associations that support segment-specific customers (e.g., dairy farms, mushroom growers, etc.).

Table D.5: Key Partners	
Key Partners	Support Activity
Agricultural Trade Organizations and Universities	Agricultural trade organizations and universities can provide an effective path to agricultural sector collaboration, particularly by serving as a trusted source of information about business concerns facing specific agricultural segments. Trade organizations have the ability to survey their membership to find common concerns and potential solutions. Understanding these concerns can help program administrators construct value propositions and tailor their program offerings to best serve these customers. Trade organizations have an established communications channels with the industry that can facilitate education of customers about energy efficiency programs through a variety of forums, such as social and print media, ad hoc round tables, monthly meetings, and regional or national quarterly or annual meetings. SoCalGas will collaborate with trade allies to increase program promotion and customer awareness of the benefits of energy efficiency investments.
Industry Technical Community	Specialized technical assistance with expertise in specific agricultural segments can be highly effective in identifying energy savings opportunities at agricultural facilities. The expertise can be provided by resources that include utility in-house experts, independent technical consultants, and equipment vendors.
Equipment Vendor and Manufacturers	SoCalGas will actively work with equipment vendors and manufacturers to promote greater adoption of EE equipment among the various agricultural segments.
California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) for financing	Financing will be a key program intervention strategy to overcome the high first cost of EE in the agricultural sector. SoCalGas will continue its long-term collaboration with CAEATFA to design and promote innovative financing strategies that will encourage greater customer investment in EE.

E. Statewide Program Coordination

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and very collaborative, on-going relationship among all implementers and program administrators. A detailed discussion will be presented in the final business plan, which will include a process by which administrators will consult and collaborate among each other to ensure effective statewide implementation across all service territories.

F. Crosscutting Sector Coordination

1. Local Marketing and Statewide Marketing, Education & Outreach Integration

The sector programs will rely on a combination of locally targeted promotion of specific energy efficiency programs tailored to the various segments throughout the sector. There will be a focus on historically underserved customers with higher EE potential, through data analytics, to encourage greater program participation.

Since the statewide Marketing, Education, and Outreach (ME&O) program's short-term goal is focused on the mass market customer (i.e., residential and small business owners), the agricultural sector programs will focus its outreach to agricultural customers on the importance of energy efficiency, their opportunities to act and the benefits of their actions. The Small Agricultural Outreach will provide customer-specific information and services to help the customer modify their energy consumption behavior and to install EE retrofits. SoCalGas will actively participate in both the development of the five-year ME&O Strategic Roadmap and Annual Joint Consumer Action Plans to coordinate program offerings with the statewide marketing efforts and to support the short and long-term goals of the ME&O program.

2. Workforce Education & Training Integration

The Workforce Education & Training (WE&T) is well positioned in its role of facilitating training on the skills needed by the workforce to perform the type, level, and quality of work to reduce energy consumption and achieve the energy savings targeted by the State. WE&T will provide classes, seminars, consultations, and demonstrations to support local government training programs for code compliance. WE&T will also assist agricultural customers (and their staffs) by providing technical education and/or field training to help the agricultural customer convert interest into EE actions.

3. Emerging Technologies

California's agricultural sector is unique among utility customer segments in that it is suffering disproportionately from the effects of a multi-year drought. If there is any upside to this ongoing crisis, it is that energy savings and water savings can often both be realized in a single efficiency measure. This can make upgrades or improvements easier to justify than in sectors where the largest energy-saving opportunities and the largest water-saving opportunities may come from completely different measures. However, energy-saving opportunities in this sector go beyond purely water-related measures, and include integrated 'whole farm' solutions, improvements in the facilities where produce is stored, and emerging indoor agriculture opportunities.

A problem the agricultural sector in California faces is a dwindling number of EE measures. To address this shortfall, the statewide ETP has adopted a long-term vision of addressing the lack of technology supply that can hinder EE portfolio success. To realize this vision, the ETP has outlined two medium-term solutions: working upstream with product developers to integrate energy-saving attributes in the product design phase and motivating technology developers to build integrated (i.e. 'whole farm') solutions. The ETP has identified methods of reaching product developers to accelerate these solutions, including collaborating with the PIER and EPIC programs, as well as hosting quarterly ETCC sector meetings and Open Forums that serve as platform for tech companies and utilities to collaborate, including in the agriculture space.

Elsewhere in the agriculture industry, indoor agriculture is a small but growing industry subsector. Because this subsector is new and very different from traditional agriculture, it is fertile ground for

innovative new technologies—particularly in HVAC and lighting. ETP will conduct technology evaluations and market interventions that can increase the energy efficiency and DR opportunities within this emerging subsector. Indoor agriculture also offers unique opportunities to implement SB 350, which seeks to double the state’s previous efficiency goals. To achieve this, utilities need to seek out savings opportunities in sectors that are growing and are experiencing a high degree of technological innovation, both of which apply to indoor agriculture.

4. Codes & Standards

The Statewide Codes and Standards (C&S) Program saves energy on behalf of ratepayers by influencing standards and code-setting bodies, such as the California Energy Commission (CEC) and the Department of Energy (DOE), to strengthen EE regulations by improving compliance with existing C&S, assisting local governments to develop ordinances (reach codes) that exceed statewide minimum requirements. The C&S effort will also draw upon agricultural customers, where applicable, into the code development in the early stages to advocate for codes and compliance-related matters.

5. Other DSM Program

To assist customers in managing their energy, the program strategies presented in this business plan will be coordinated and integrated with other customer demand-side opportunities, where feasible.

a. Integrated DSM

The integrated Demand-side Management (IDSM) encourages the integration of a full range of DSM options such energy efficiency, advanced metering, low income energy efficiency, distributed generation, alternate fuel vehicles. In short, IDSM is fundamental to achieving California’s strategic energy goals. IDSM efforts will continue to identify and promulgate best practices, address implementation and program policy issues across customer DSM programs. IDSM will specifically look for integration opportunities, identify integration barriers, and work with both program administrator and program implementer staffs to promote the advancement of integration, using lessons learned and best practices to establish a continuous improvement process. Although, not a program, IDSM will help other DSM programs to integrate and compliment with each other to facilitate a simple, effective DSM engagement with the customer.

b. Demand Response

The agricultural sector business plan proposes to leverage emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and energy management technologies to permanently modify customer behavior, which will result in reliable energy efficiency savings and serve to support utility demand response activities. Where practicable, these efforts will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency and demand response experience.

c. Residential Rate Reform

Not applicable.

d. Integrated Demand Side Resources

[Pending]

e. Alternate Fuel Vehicles

In California, SB 350, codified in Public Utilities Code § 740.12(a)(1), states the following goal: “Advanced clean vehicles and fuels are needed to reduce petroleum use, to meet air quality standards, to improve public health, and to achieve greenhouse gas emissions reduction goals.”⁸ The agricultural sector business plan proposes to increase awareness of alternative fuel vehicle options to serve the agricultural sector transportation needs to significantly reduce nitrous oxides (NOx) and GHG emissions. Consistent with SB 350’s goals to address barriers to access for low-income customers to zero-emission and near-zero-emission transportation options⁹, outreach efforts directed at agricultural customers within disadvantaged communities to emphasize the benefits and opportunities for alternate fuel vehicles supporting the agricultural sector.

In addition to alternate fuel vehicles to promote GHG emission reduction, the agricultural sector affords unique opportunities in the dairy segment. Anticipated developments in the dairy biomethane and organic waste diversion industries could also provide unique opportunities to engage with the agricultural sector to affect positive energy and environmental changes. Various end-uses, such as water pumping, could be upgraded from diesel to be fueled with cleaner-burning, more efficient natural gas. Engaging with developers to ensure that new organic waste diversion facilities are designed using state-of-the-art energy efficient technologies and practices can help to improve the handling of agricultural waste and could reduce transportation fuels consumed in managing this waste stream and help to improve air and water quality for the region.

f. Energy Savings Assistance (Multifamily)

Various customer segments within the agricultural sector rely heavily upon seasonal labor to harvest crops. Where multifamily housing exists to support the labor pool, the agricultural sector will coordinate with both the SoCalGas Energy Savings Assistance program and residential EE sector programs to improve the efficiency of such multifamily units through deep, comprehensive EE retrofits.

g. Sourcing

Sourcing for the program intervention strategies will call upon the innovative proposals of the program implementer community and the unique market position of the utility. Specific programs will be designed and delivered in the appropriate market channel by third party implementers. The scope of the request for proposals for programs will be guided by the adopted program strategies represented in this business plan. The third party program implementer community will be called upon to propose specific program designs and delivery approaches as part of the program solicitation process. SoCalGas will collaborate with selected third party implementers to further program design to integrate with other energy efficiency strategies within the portfolio and to increase the likelihood of success.

To maintain current efficiencies and avoid customer confusion and frustration, key customer services, in support of the energy efficiency portfolio, will be maintained by SoCalGas in close coordination with the program implementer. These customer services include: customer representative to promote EE programs and program implementer customer engagement; processing customer rebate payment for downstream programs; project engineering reviews; program inspections; utility website to promote

⁸ Public Utilities Code § 740.12(a)(1).

⁹ See SB 350 (Statutes 2015, Chapter 547), at Section 7. See CAL. PUB. UTIL. CODE §25327(d).

and receive customer requests for participation; and managing customer requests/complaints to SoCalGas.

Consistent with a key principle of the EE rolling portfolio to promote a healthy and vibrant EE ecosystem in California, for both large and small providers, SoCalGas will release a series of competitive solicitations, on annual basis, to allow for continuous opportunities for the EE service provider community and to encourage ongoing innovation within the EE portfolio. SoCalGas plans to launch the first set of program solicitations in 2017 in expectation of Commission approval of the energy efficiency business plan application. The following provides the solicitation plan, including estimated timeline for each program solicitation and implementation, for the sector through 2020:

Program Strategy	Program Tactic	RFP Release Date	Implementation Date
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD

h. EM&V Considerations

The agricultural sector contains a wide variety of segments with very unique and divergent ways they use energy. There is a need for a deeper level of research on each of the different segments and sub-segments within the agricultural sector.

The agricultural customer can benefit greatly from permanent changes in their energy usage. Whether changes are permanently adopted can be heavily influenced by the customer expectation/perception of cost savings and improved crop yield and/or quality. Identifying and/or creating segment-specific industry benchmarks are key to helping the customer understand and adopt operational process improvement to better manage their energy. Studies examining industry-specific benchmarking will be paramount in convincing the customer to adopt energy efficiency.

The following are recommendations to improve the body of knowledge regarding the agricultural sector.

Market Research and Process Evaluation:

- Conduct a market study to identify the unique segments within the agricultural sector and to examine their unique characteristics and trends within their specific segment or sub-segment.
- Interview agricultural customers to identify where program participation process can be simplified.
- Identify a set of common industry benchmarks, segment and sub-segment, that will drive the customer to adopt EE as part of their business operations.

Load Impact:

- Use normalized metered energy consumption data to determine the overall impact of O&M and behavior measures as an enhanced approach to quantify energy savings. For this approach, energy savings are calculated as the difference between the normalized metered energy consumption for baseline and post-intervention time periods.
- Consistent with AB 793 (§717(3)) requirements, evaluate gas energy savings claims achieved pursuant to the incentives for energy management technologies, directed at the multi-dimensional customer, to determine if the program strategies shall continue or be modified.

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Appendix A: Sector Metrics

Energy Efficiency Business Plans: Sector Metric Table - Agricultural Sector									
Problem Statement	10-Year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets(8-10+ years)
A considerable number of small agricultural customers lack technical and financial resources.	Energy efficiency will support the long-term economic and environmental success of California agriculture.	1. Substantial increase in deeper, comprehensive natural gas EE savings from smaller-sized customers.	Partnering Intelligent Outreach Small Agricultural Outreach Customer Incentives Direct Install Midstream EE Equipment Agricultural Financing Emerging Tech. Promotion	Increase EE savings in smaller-sized (<50k therms) customer group.	2015 Participation Levels.	Program tracking data.	Increase EE savings from smaller-sized customers by 5% over 2015 levels by Year 3.	Increase EE savings from smaller-sized customers by 15% over 2015 levels by Year 7.	Increase EE savings from smaller-sized customers by 25% over 2015 levels by Year 10.
The agricultural sector has competing priorities, which may overshadow energy efficiency.		2. Increase customer acceptance of the natural gas EE value proposition.	Partnering Intelligent Outreach Small Agricultural Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Agricultural Financing Emerging Tech. Promotion	Increase participation in EE programs.	2015 Participation Levels.	Program tracking data.	Increase participation in EE programs by 5% over 2015 levels by Year 3.	Increase participation in EE programs by 15% over 2015 levels by Year 7.	Increase participation in EE programs by 25% over 2015 levels by Year 10.
A diverse agricultural		3. Substantial increase in	Partnering Intelligent Outreach	Achieve greater	2015 Participation	Program tracking	Increase EE savings from	Increase EE savings from	Increase EE savings from

Energy Efficiency Business Plans: Sector Metric Table - Agricultural Sector

Problem Statement	10-Year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets(8-10+ years)
sector base makes it difficult to offer programs that fit the needs of all customers.		natural gas EE savings among all agricultural segments.	Small Agricultural Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Agricultural Financing Emerging Tech. Promotion	levels of EE savings from all agricultural segments including smaller-sized customers.	Levels.	data.	agricultural sector by 5% over 2015 levels by Year 3.	agricultural sector by 15% over 2015 levels by Year 7.	agricultural sector by 25% over 2015 levels by Year 10.

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Appendix B: Applicable Legislation and Regulatory Directives

Appendix B: Applicable Legislation		Program Intervention Strategies
SB 350	<p>§25310(c)(5) The energy efficiency savings and demand reduction reported for the purposes of achieving the targets established pursuant to paragraph (1) shall be measured taking into consideration the overall reduction in normalized metered electricity and natural gas consumption where these measurement techniques are feasible and cost effective.</p>	P4P, SEM, Data Analytics
	<p>§25943(a)(2) The comprehensive program may include, but need not be limited to, a broad range of energy assessments, building benchmarking, energy rating, cost-effective energy efficiency improvements, public and private sector energy efficiency financing options, public outreach and education efforts, and green workforce training.</p> <p>**“Energy assessment” means a determination of an energy user’s energy consumption level, relative efficiency compared to other users, and opportunities to achieve greater efficiency or improve energy resource utilization.**</p>	SEM, Data Analytics
	<p>§25943(a)(3) The CEC shall adopt, implement, and enforce a responsible contractor policy for use across all ratepayer-funded energy efficiency programs that involve installation or maintenance, or both, by building contractors to ensure that retrofits meet high-quality performance standards and reduce energy savings lost or foregone due to poor-quality workmanship.</p>	All offerings supporting installation and maintenance
	<p>§25943(d)(5) Determine, for nonresidential structures, the availability of an appropriate cost-effective energy efficiency assessment system and whether there are a sufficient number of certified raters or auditors available to meet the program requirements.</p>	
	<p>§399.4 (d) In updating its policies, the commission shall, at a minimum, do all of the following:</p>	
	<p>(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.</p>	Midstream Equipment, Intelligent Outreach, SEM, P4P
	<p>(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.</p>	SEM, P4P
	<p>(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.</p>	SEM, P4P
	<p>(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results.</p>	SEM, P4P, Deemed, Calculated

Appendix B: Applicable Legislation		Program Intervention Strategies
AB 793	§717(3)(b) "Energy Management Technology" may include a product, service, or software that allows a customer to better understand and manage electricity or gas use in the customer's home or place of business.	SEM, Intelligent Outreach
AB 802	"§381.2(b) Recognizing the already underway 2015 commission work to adopt efficiency potential and goals, the Energy Commission work on its 2015 energy demand forecast, and the need to determine how to incorporate meter-based performance into determinations of goals, portfolio cost-effectiveness, and authorized budgets, the commission, in a separate or existing proceeding, shall, by September 1, 2016, authorize electrical corporations or gas corporations to provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings. Those programs shall include energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations, as well as operational, behavioral, and retrocommissioning activities reasonably expected to produce multiyear savings. Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission. The commission may adjust the energy efficiency goals or targets of an electrical corporation and gas corporation to reflect this change in savings estimation consistent with this subdivision and subdivision (d)." [Emphasis, added]	SEM, P4P, Intelligent Outreach
	"(c) Effective January 1, 2016, electrical corporations and gas corporations are authorized to implement the provisions of subdivision (b) for high opportunity projects or programs. The commission shall provide expedited authorization of high opportunity projects and programs to apply the savings baseline provisions in subdivision (b). (d) In furtherance of subdivision (b), the commission, in consultation with the Energy Commission, shall consider all of the following: (1) The results of any interagency baseline assessment. (2) Any available results from investor-owned utility baseline pilot studies ordered in D.14-10-046. (3) Information necessary to ensure consistency with the energy forecast and planning functions of the Energy Commission and the Independent System Operator. (e) The commission may direct electrical corporations and gas corporations to make filings that are necessary to ensure coordination with the energy forecast and planning functions of the Energy Commission and the Independent System Operator."	SEM, P4P

Appendix B: Applicable Legislation		Program Intervention Strategies
SB 1414	<p>§399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive provides proof of permit closure and certifies that the improvement or installation has complied with any applicable permitting requirements and any specifications or requirements set forth in the California Building Standards Code (Title 24 of the California Code of Regulations), and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.</p>	P4P, SEM, Calculated, Deemed
	<p>"(d) The commission, in a new or existing proceeding, shall review and update its policies governing energy efficiency programs funded by utility customers to facilitate achieving the targets established pursuant to subdivision (c) of Section 25310 of the Public Resources Code. In updating its policies, the commission shall, at a minimum, do all of the following:</p> <p>(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.</p> <p>(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.</p> <p>(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.</p> <p>(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results."</p>	P4P, SEM, Intelligent Outreach, Calculated, Deemed

Appendix B: Sector-specific CPUC Regulatory Directives

Regulatory Directives	Cite	Response
<p>As the strategic energy management approach leads to capture of additional savings from behavioral, retrocommissioning, and operational activities, as well as identification of bigger opportunities and tracking of projects planned by the customer, we direct the utilities to modify their continuous energy improvement programs or develop new programs to offer a robust strategic energy management program, using a statewide program design. We note in Section 4.9.2 below that strategic energy management appears to be a candidate for statewide implementation and strongly urge the utility program administrators to select this as one of the program areas that falls under this approach.</p>	<p>D.16-08-019, p. 42</p>	<p>See, Program Strategies discussion. The agricultural sector business plan proposes a new Strategic Energy Management program strategy with key design features based on best practices from other SEM program offered in the industry. The proposed program strategy represents a coordinated statewide effort across all IOU program administrators.</p>
<p>Instead of requiring the large commercial sector to be 100 percent third-party designed and delivered beginning in 2017, we will ask the utility program administrators (and other program administrators, as desired) to present to us in their business plans a proposal for transitioning the majority of their portfolios to be outsourced as described by the CEEIC, with the transition completed by the end of 2020. Basically, all program design and delivery would be presumed to be conducted by third parties, unless the utility specifically made a case for why the program activity must be conducted by utility personnel.</p>	<p>D.16-08-019, p. 71</p>	<p>See, Program Delivery discussion.</p>
<p>Program administrators shall ensure a smooth transition between existing energy efficiency program activities and the changes outlined in this decision, to be proposed in the business plans due January 15, 2017, minimizing program disruptions and avoiding any funding hiatus for ongoing efforts or partnerships.</p>	<p>D.16-08-019, OPN 14, p. 112</p>	<p>See, Program Delivery discussion. During the transition to a new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market.</p>
<p>Utility program administrators shall</p>	<p>p. 72</p>	<p>See, Program Delivery discussion. SoCalGas</p>

Appendix B: Sector-specific CPUC Regulatory Directives

Regulatory Directives	Cite	Response
<p>present their transition plans to effectuate at least this minimum level of third party delivery in their business plans for the Commission’s consideration. In cases where utilities propose to continue staffing program design and/or delivery functions with utility personnel, they should explain why this continues to be necessary.</p>		<p>proposes to continue to offer customer service support to help facilitate a simple customer engagement and to support efficient program delivery.</p>
<p>62. The business plans should include specific information from the program administrators about solicitation strategies for statewide and third-party programs and functional areas that could be performed on a statewide basis.</p>	<p>p. 106</p>	<p>See, Program Delivery discussion. The proposed program solicitation strategy promotes the continuation of a healthy EE provider ecosystem in California.</p>
<p>We will require the business plans to include specific information about solicitation strategies and functional areas that could be performed on a statewide basis.</p>	<p>p. 65</p>	
<p>8. All upstream and midstream programs, including but not necessarily limited to the following programs and/or subprograms from the existing portfolio, plus new programs proposed in business plans that are market transformation, upstream, or midstream, shall be delivered statewide according to the definition in Ordering Paragraph 5 above: Residential: Plug Load and Appliance Midstream, Heating Ventilation and Air Conditioning (HVAC) Upstream/Midstream, New Construction; Commercial: HVAC Upstream/Midstream, Savings by Design; Lighting: Primary Lighting, Lighting Innovation, Market Transformation; Financing: New Finance Offerings; Codes and Standards: Building Codes Advocacy,</p>	<p>pp. 110-111</p>	<p>See, Program Delivery discussion. All upstream and midstream programs, new or existing, will be delivered according to the CPUC’s statewide approach for EE programs.</p>

Appendix B: Sector-specific CPUC Regulatory Directives		
Regulatory Directives	Cite	Response
Appliance Standards Advocacy; Emerging Technologies: Technology Development Support, Technology Assessments, Technology Introduction Support; Workforce, Education, and Training: Connections; Government Partnerships: California Community Colleges, University of California/California State University, State of California, Department of Corrections and Rehabilitation.		

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Appendix C: EM&V Studies

CPUC EM&V Studies:

- Navigant Consulting. Energy & Resource Solutions – Nonresidential Program Assessments: Third-Party Industrial and Agricultural Program Group, prepared for the CPUC and the California IOUs. 2012.
- Navigant Consulting. Energy Efficiency Potential and Goals Study for 2015 and Beyond, prepared for the California Public Utilities Commission. September 2015.
- Navigant Consulting. Measure, Application, Segment, Industry (MASI): Agriculture, Prepared for Southern California Edison. 2015.
- Navigant Consulting. Market Characterization Report for 2010-2012 Statewide Agricultural Energy Efficiency Potential and Market Characterization Study. April 2013.

Other Studies & Sources:

- Extension.org. USDA Small Farm Definitions. August 2013.
<http://articles.extension.org/pages/13823/usda-small-farm-definitions>
- Hurley, David. Does One Size Fit All? Small Farms and US Meat Regulations. Environmental Health Perspective, 116(12). December 2008.
- Hurley, Sean and Noel, Jay. An Examination of the Regulatory Cost on California Agricultural Producers. American Agricultural Economics Association Annual Meeting. 2006.
- Pacific Institute. Impacts of California's Ongoing Drought: Agriculture. August 2015.
<http://pacinst.org/wp-content/uploads/sites/21/2015/08/ImpactsOnCaliforniaDrought-Ag.pdf>
- Stumbos, J. Small Farmers: Who are they and why do they matter? California Agriculture 47(2):6-7. March-April 1993.
- Sustainable Agriculture Education (SAGE). Coyote Valley Greenbelt Research for City of San Jose. June 2015.
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<http://www.urbanfarming.org/about.html>
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- Walker et al., Measure, Application, Segment, Industry (MASI): Finding the Remaining Energy Efficiency Potential through Market Assessment, ACEEE Summer Study, 2015.

Appendix D: External Stakeholder Observations

Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
There are part of Ag industry that are working up their own certification to be green, PAs should work with them	3/17/16 Ag Sector Mtg	3/17/2016	See, Key Partner discussion.	
With the many challenges facing delivery of programs to this sector, it may be time to address whether the current measurement techniques are appropriate or whether incorporating other benchmarks, such as increased yields resulting from measures are more reflective of the sector. Better yields translate to less inputs per unit and thus greater efficiencies. See CFBF-1 [AG0297]	AG0297	6/8/2016	See, Perceived Market Barriers discussion under performance uncertainties. See, Intelligent Outreach – Data Analytics seeking to create industry benchmarks at the customer segment level. See EMV discussion proposing segment-specific benchmarking studies.	
Re SCG Ag Sector Stage 2 documents. Page 3, See CFBF-13 [AG0297] All of the utilities have dedicated account representatives for customers with an established threshold of revenue. Those customers have more interaction and opportunities for understanding the program offerings. A concerted effort to develop outreach to all customer levels must be considered to more effectively communicate the programs.	AG0297	6/8/2016	See, Intelligent Outreach program intervention strategy discussion which promotes efficient and effective outreach relying on customer energy consumption patterns.	
We see a need for more flow-meter for growers. Are you (IOUs) open to incentives or financing to support flow-meters?	5/13/16 Ag Sector SC Mtg Notes	6/10/2016	Not applicable to gas energy efficiency solutions.	

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
For on-bill financing, have you IOUs looked at the restrictions for the crop loan? We need to make sure the utility's finance program would not violate the restrictions of the crop loan.	5/13/16 Ag Sector SC Mtg Notes	6/10/2016	Unknown. The OBF program is offered to agricultural customers for EE improvements with a minimum \$5,000 threshold. Small customers typically don't pursue such loans as they cannot meet this threshold. Crop loans are loans short term credit for seasonal agricultural operations such as activities include, among others, ploughing and preparing land for sowing, weeding, transplantation where necessary, acquiring and applying inputs such as seeds, fertilizers, insecticides etc. and labor for all operations in the field for raising & harvesting the crops.	
In your presentations, I heard a lot of the same old stuff I have heard over the last 9-years. I would like to hear what are the near-term and longer-term activities. What is the time line and reality for what you are proposing over the next five years?	5/13/16 Ag Sector SC Mtg Notes	6/10/2016	See, Program Intervention Strategies for the implementation timing of new program strategies in the agricultural sector.	
IOUs should address the cannabis energy efficiency issues even though it is awkward because it will be a major impact in a very short time.	5/13/16 Ag Sector SC Mtg Notes	6/10/2016	See, Key Trends discussion on the potential energy impact as a result of legalization. Current federal laws may prohibit the use of ratepayer funds to support any activities in this emerging industry.	

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
NRDC-1 (re page 6) Unclear why data programs would take 4-7 years. Explain why it would take 4-7 years to stand up programs to better integrate customer data (e.g., is it the software isn't available? CPUC process? Other?)	AG0335	10/2/2016		0297

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
NRDC-2 - (re page 15) #2 and #6 seem similar and on #5 - unclear what the problem is. Suggest combine #2 and #6. Elaborate on the problems with Ag financing (or reference the part of the document where it's explained)	AG0335	10/2/2016		0298

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>NRDC-3 - (re page 22) The calculators on p.23 seem to be for farmers to calculate the benefits of projects, but it is unclear how it aligns with the CPUC calculator (e.g., are the new calcs pulling the assumptions from the CPUC?) Perhaps a footnote could clarify the relationship.</p>	AG0335	10/2/2016		0299

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>NRDC-4 - (various pages -- see source document)</p> <ul style="list-style-type: none"> · p.4, fn4 – mentions 4 segments but includes only 3; Dairies seems to be missing from the list · p.5, p.17, p.22 etc. - when note “successful” programs/efforts, what is the measurement of success? (e.g., TRC, participation?) · p.16, Table 3 – language is different than text, make consistent both in language and #s of barriers (e.g., table has 4 but text has 6) · p.16 - states “recreational” cannabis was legalized (past tense), does PG&E mean medical? · P.17 – does “internal development” happen before an assumed external stakeholder process (which is yet to be determined) · P.31 – what is the alternative rate structure and how is it intending to address some of the barriers? 	AG0335	10/2/2016		0300

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>TURN-1 (re page 4,14) Water availability and conservation and associated costs are a significant game changer in PG&E's AG efficiency efforts. It appears that PG&E is very cognizant of this fact. TURN recommends that PG&E further sharpen its immediate and near term AG efficiency around water availability and conservation to minimize possible key conflicts between energy efficiency and water conservation (ie. price differences between standard and higher efficiency larger pump for deeper groundwater).</p>	AG0349	10/3/2016		0410

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>TURN-2 (re page 23) PG&E lists the following tactics to improve and prioritize energy efficiency agricultural program offerings relevant to water conservation and the water/energy nexus: Tactic: new, midterm: Expand pump efficiency test program model to irrigation system evaluation and design, expanding awareness and access to energy efficiency tools linked to irrigation. Tactic: new, midterm: Cross-cutting – Emerging Technologies. Explore new products and tools that incorporate water savings, including work with deep-root irrigation and closed- loop irrigation that save growers both energy (in reduced pumping and irrigation) and water.</p> <p>These and similar related tactics should be advanced to near-term. Given the increasing focus on water, TURN recommends a discussion of strategic partnerships with regional water districts and water entities, including status of partnerships to date, what’s working well, and ongoing opportunities and challenges.</p>	AG0349	10/3/2016		0411

Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
<p>TURN-3 (re page 6) Strategic partnerships including regional water districts.</p> <p>Given the increasing focus on water, TURN recommends a discussion of strategic partnerships with regional water districts and water entities, including status of partnerships to date, what's working well, and ongoing opportunities and challenges.</p>	AG0349	10/3/2016		0412

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>TURN-4 (re page 26) PG&E discusses the following barriers to EE.... PG&E offers the following tactics for overcoming these barriers:</p> <p>New, midterm: Cross-cutting - Finance: Expand existing and planned financing offerings such as OBF and OBR, and develop new financing partnerships to address problems around capital availability for first costs, with a specific focus on project co-pay over the \$100,000 ceiling for OBF.</p> <p>New, midterm: Cross-cutting Finance: Explore extending OBF repayment periods beyond the current standard of five years—up to ten— to provide near-term relief for customers requiring greater flexibility for large capex investments.</p> <p>New, midterm: Cross-cutting - Finance: Explore new, lower risk financing structures for the sector as they become available, beyond simply supplementing existing OBF (up to the current \$20,000 cap) with OBR (which carries variable risk depending on how third-party loans are structured) for greater liquidity.</p> <p>This is a critical barrier with potentially important tactics. TURN very strongly suggests that these tactics be moved to the near term.</p>	AG0349	10/3/2016		0413

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>TURN-5 (General Comments) TURN's review and comment on PG&E's draft Agricultural business plan chapter focuses on Item 2. Content-Related Review, items d – g, of the CAEECC's suggested guidance review. TURN also considered the extent to which the draft BP chapter addresses customer sector market barriers to greater participation and deeper savings through innovations and synergies via existing and possibly new customer- and market-based strategies and tactics. TURN's assessment of PG&E's agricultural BP chapter is that it is a very crisp and clean overview and presentation of the agriculture sector in PG&E service territory, and a thoughtful and thorough set of strategies and tactics to advance energy efficiency as the ongoing drought further complicates the resource (time and money) competition farmers' face. The draft BP chapter serves the key dual purposes of reasonably informing policy makers, regulators, and stakeholders of PG&E's ongoing efficiency plans for the agricultural sector, while providing non-utility implementers a reasonable amount of information and data to begin to consider possible competitive efficiency opportunities.</p>	<p>AG0349</p>	<p>10/3/2016</p>		<p>0414</p>

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
TURN looks forward to reviewing PG&E's BP in its entirety.				

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Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
<p>TURN-6 (General Comments) Customer sector goals and program savings, budgets, and cost-effectiveness are forward looking. The BPs are intended to be integral to California moving the current generally flat or stagnant needle on energy efficiency. Some quantitative context to the current portfolios and programs would be very helpful.</p> <p>We recommend that all data on projected customer sector goals and program savings, budgets, and cost-effectiveness be given some context relative to ongoing customer sector activities and accomplishments. There needs to be some demonstration as to how the BP will advance savings and improve cost-effectiveness.</p>	AG0349	10/3/2016		0415

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>TURN-7 (General Comments) It is not clear whether projected savings are gross annual. In D.16-08-019 (atp.21), the Commission directed a return to net goals and the development of cumulative goals for application in 2018 to support the State's SB 350 efforts.</p> <p>If not already included, we commend that PG&E provide projected customer sector goals and program savings in net annual and net cumulative form, with the basis for net provided, and cumulative specified by the estimated average EUL by customer sector and key programs. Indicate the basis (ie end use, measures) for the estimated average EUL(s).</p>	AG0349	10/3/2016		0416

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>TURN-8 (General Comment) SCE in its Public Sector BP chapter (p. 13) states: “The declining cost and increased adoption of solar and battery storage is making a great impact on the EE marketplace.” TURN observes that this statement also applies to PG&E’s BP and is a critically important matter that should be addressed.</p> <p>TURN recommends PG&E address the impact of solar and battery storage on the EE marketplace as part of a discussion of overarching market trends.</p>	AG0349	10/3/2016		0417

Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
ORA-1 (re page 3) Background presentation is well done. We hope to see the same quality as you do the other chapters. We are particularly happy with the extensive use of evaluation studies and the detailed picture of the sector and well characterized market barriers.	AG0356	10/3/2016		0490

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>ORA-2 (re page 37) Metrics need to be defined more carefully. "Access to a tool that will break down energy use" assumes that access is the goal and that access will produce energy savings. If this target is correct, PG&E still needs to produce a meaningful target.</p> <p>The same holds for the "percent of core energy-using equipment that meet EE criteria" metric on p. 37. Again, no target proposal and not even baseline market data. The definition of the metric is unclear (is this counted by piece of equipment, by energy intensity, what is core equipment, what qualifies as energy efficient equipment, etc.) It seems unrealistic to think this will be meaningful over time and useful to judge performance.</p>	AG0356	10/3/2016		0491

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
ORA-3 (re page 39) Proposal for increasing TRC lacks any targets and there is no text to substantiate that there is a substantive strategy for achieving this;	AG0356	10/3/2016		0492

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Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
ORA-4 (re page 39) Some proposed targets are substantially below current performance w/o any substantive explanation o Example: metric on p.39 annual energy savings, the proposed targets area 50% annual decline from current performance, from 60 GWh/year to 40 GWh/yr	AG0356	10/3/2016		0493

Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
<p>ORA-5 Absence of a budget makes it impossible to verify whether it aligns with strategy and plan</p> <p>o The absence of any budget information makes it difficult to understand what resources PG&E intends to commit to the sector and whether they are sufficient/reasonable given the plan</p>	AG0356	10/3/2016		0494
<p>ORA-6 - No Solicitation Strategy for the sector is presented.</p>	AG0356	10/3/2016		0495

Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
<p>Notes page 28 - • PG&E provided great background and good examples. It demonstrates a lot of thought about the sector and provides information that would be useful to bidder.</p> <ul style="list-style-type: none"> • Some proposals are too vague. For example, strategic partnerships (p. 6). The partnership is not well defined and I don't understand how it will work. • Metrics also can be better defined. • With regard to the plan for how things will be bid out, it is important for the Commission to have expected dollars on annual basis and expected savings. Information about size of programs would also be useful in developing RFPs by implementers. • To the extent targets are changing from current performance, I'd like to see discussion of why you are making changes (ex. p .39). I'd like to see clear substantiation for all numbers included. 	Not Yet Posted	10/4/2016		0574

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>Notes page 28 - • I thought the comparison from before and after stood out as compared with other draft chapters.</p> <ul style="list-style-type: none"> • PG&E may be the only one that provided analysis of “modified” versus “new.” I really liked this. It makes it clear for reader where you are going. I would like other PAs to highlight when things are new or modified. • With regard to mid-term programs, I didn’t understand why they would take so long. Perhaps PG&E can provide more information about why they will take so long. • I like maps of agriculture. • Some of trends and challenges could be combined. Some seemed redundant. • PG&E also had a good comment table. It cited tracker number which makes it extremely easy for us to get back and confirm that you considered the issue. • It would also be good if you could consolidate mapping a little more. 	<p>Not Yet Posted</p>	<p>10/4/2016</p>		<p>0575</p>

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
<p>Notes page 28-29 - I enjoyed this chapter.</p> <ul style="list-style-type: none"> • I have an issue regarding water conservation vs Energy Efficiency (p. 14). Improving Energy Efficiency relative to water conservation (p. 27) needs to be a pivotal element of Energy Efficiency in the state going forward. • I appreciate the discussion regarding on-bill financing, not just in Agriculture but across all sectors. • I really appreciate early statistics. • It would be helpful to know what we have accomplished over time in pump overhauls, etc. • Regarding changes in baseline pump inefficiencies, I hope that water conservation matter and how Energy Efficiency fits in as a complement to that can be addressed further in this sector. • I'd also like to see more discussion of pump efficiency. 	<p>Not Yet Posted</p>	<p>10/4/2016</p>		<p>0576</p>

Appendix D: External Stakeholder Observations

Recommendation	Source	Date	Response	Reference
Notes page 29 - I totally agree that pumps are the link to customers in this sector. Irrigation optimization is the future. If incentives go away, then irrigation optimization will be offered with bad pumps.	Not Yet Posted	10/4/2016		0577

Appendix D: External Stakeholder Observations				
Recommendation	Source	Date	Response	Reference
Notes page 29-30 - There was little in BPs or discussion today addressing the Guidance Decision ordering directive that Statewide programs are also designed to achieve market transformation (Op., p. 106). The logistics of setting up the Rolling Portfolio, and moving Statewide PAs are overshadowing this question right now, understandably, but it will need to be addressed over time. I hope to provide comments on how Statewide MT approaches could begin to be advanced in a way compatible with the Energy Division Market Transformation Program Design and Policy Framework White Papers (2014) in the Business Plans by September 28.	Not Yet Posted	10/4/2016		0578

Appendix E: Glossary of Terms & Definitions

Appendix E: Common Terms & Definitions	
Program Intervention	A deliberate effort by utilities to intervene in the market to reduce market barriers and thereby change the level of investment in (or practice of) energy efficiency. An intervention's success in reducing market barriers, therefore, hinges on whether it leads to or causes a net beneficial outcome from a societal perspective.
Program	A set of tactics offered to the customer as part of a program intervention.
Tactics	An action embodied within a program to carry out a program intervention strategy.
Sector Metric (aka, market effect metric)	Indicator of progress towards achieving desired market effect(s). For the purpose of developing EE business plans, sector metrics only reflect the PA program intervention strategies, and rely on readily available data to allow for active monitoring by PA of progress towards achieving desired market effect.
Program Intervention Metric	Indicator of progress towards achieving a desired market effect by a program intervention through monitoring of program strategy output activities. A program's theory explains why the desired market effects are expected to result from the program's output and activities.
Baseline	The minimum or starting point used to compare the metric progress to achieving stated target.
Sector Target	The quantitative goal towards which a sector metric tracks progress. Sector metrics and targets can be used with both sector-level outputs and sector-level outcomes, whichever is more useful to the PA.
Program Target	The numeric value assigned to the program metric. The numeric value assigned to the program metric. The quantitative goal towards which a program metric tracks progress. Program metrics and targets can be used with both program outputs and program outcomes, whichever is more useful to the PA.
Desired market effect	A market effect is a change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).
Problem Statement	A summary of market barriers identified within a customer sector.
Market Barriers	Those market characteristics that inhibit the natural market adoption of energy efficiency without need for market intervention. (see, set of market barrier)
Short-term	1-3 years
Mid-term	4-7 years
Long-term	8-10+ years
Market Channel	The point of entrance in the marketplace by a program. (downstream, midstream, upstream)

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Commercial Sector Chapter

Draft

October 18, 2016



A  Sempra Energy utility

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A. Executive Summary

Southern California Gas Company’s commercial sector represents nearly 10% of the natural gas consumed by all customers. Southern California, and specifically, the SoCalGas service area, includes a very large commercial market due to the large, vibrant, and diverse southern California economy. The economy ranks as one of the top economies in the world. The Southern California Gas’ commercial sector represents a very large and diverse customer base with 11 unique customer segments. The vast majority of SoCalGas’ commercial accounts are small to medium-sized businesses, which account for approximately 61% of the commercial sector energy usage annually. A large number of these smaller customers use gas in a manner similar to a residential customer. There is a significant amount of untapped energy savings associated with potential changes in customer operations and practices.

The commercial sector business plan includes a combination of proven and newer program strategies coupled with inventive approaches to efficiently identify customers with the greatest energy efficiency opportunities using data analytic advancements enabled by SoCalGas’ newly implemented AMI infrastructure, where feasible. Using data analytics and traditional outreach approaches, SoCalGas will offer an integrated set of program strategies that meet the customer’s unique energy efficiency needs. The commercial sector presents an opportunity to capture significant amounts of behavioral energy savings opportunities. Specific program strategies will be offered to the customer to permanently capture these energy savings. To encourage greater adoption of energy efficiency among all commercial customer segments, SoCalGas will offer a simple, low cost suite of programs that are tailored to the unique customer characteristics of the commercial sector. A targeted focus will also be applied to the small business customers who operate in disadvantaged communities throughout the service area.

1. Summary Tables [Pending Revised Avoided Costs]

Table A.1: Sector Forecast Commercial

Program Impacts	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
MWh	TBD										
MW	TBD										
Therms	TBD										

Emissions

CO2	TBD										
PM-10	TBD										
NOx	TBD										

Cost-effectiveness TRC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

Cost-effectiveness PAC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

2. Proposal Compared To Prior Cycles

In past program cycles, program portfolios were offered based on specific programs and/or technologies. The sectorial business plan approach is based on customer needs and expectations, within like customer groups, proactively offered in a deliberate and efficient manner in order to significantly increase the adoption of customer energy efficiency solutions among all customer types within the sector. Taking advantage of new AMI technology, customer energy usage habits can now be examined and categorized (e.g., psychographics), through efficient data analytics, to identify how customers can incorporate energy efficiency into their business operations. No longer are energy efficiency programs passively offered when customers decide to participate. Now customers are actively pursued and encouraged to modify energy behaviors and to invest in the right energy efficiency upgrades at the right time, based on a coordinated set of program offerings, to improve the overall efficiency of their facilities.

In addition to proven program strategies, SoCalGas will incorporate new program strategies and corresponding program tactics to arrive at a complete EE solution set for the commercial customer. The proven and new program strategies are further detailed in the Program Intervention Strategies section. The new program approaches and the proposed implementation timeframe are summarized below:

Program Strategy	Program Tactic	Implementation Timing*
Partnering	Utility Partnering	Near-term, mid-term
	Industry Partnering	Near-term, mid-term
	Customer Partnering	Near-term, mid-term
Intelligent Outreach	Data Analytics	Near, mid-term
	Virtual Engagement	Near, mid-term
	Energy Management Technologies	Near, mid-term
	Sharing EE Best Practices	Near-term
	Small Business Outreach	Near-term
Strategic Energy Management		Near-term
Customer Incentives	Pay-for-Performance	Near-term
	Bundled Measures	Near-term
Direct Install	Comprehensive Direct Install	Near-term

*Note: Near-term = 1-3 years; mid-term = 4-7 years; long-term = 8+ years.

3. Response To Sector Challenges

The commercial sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engage the commercial customer to achieve both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

1. Varied and unique segments with specific needs make it difficult to offer standard program that fits the needs of all customers.

2. The commercial sector is trending towards more leased properties creating a larger split incentive barrier between owners and tenants.
3. There is builder confusion on how to achieve zero net energy (ZNE) in new construction and retrofitting of commercial buildings.
4. Improper heating, ventilation, and air conditioning (HVAC) replacement and maintenance of equipment limits the potential for significant energy savings.

B. Market Characterization

SoCalGas' commercial sector represents a very large and diverse customer base. Its solutions integrate the ideals of innovation, partnership, and customer centric approaches. SoCalGas seeks to influence the commercial building environment by creating impactful solutions that are valued by customers, sensitive to the environment, stimulate the economy, and make a difference in the communities served.

The goals of the State must be addressed at statewide levels and supported with local solutions, strategic collaboration, and cost-effective implementation. Ideas and guidance emerging from state level discussions are applied at local levels with proven and new innovative program design and implementation strategies. Some examples of concepts, initiatives, and legislation that require effective translation and collaboration include:

- New construction commercial buildings achieve ZNE by 2030
- All major renovations of existing commercial buildings reach ZNE goal by 2030
- Assembly Bill (AB) 758 – Implementing the Existing Buildings Action Plan
- Senate Bill (SB) 350 – Clean Energy

Segments and sub-segments

The SoCalGas commercial sector is defined by sixteen unique segments: construction, beauty salons, religious organizations, automotive, food service, health, lodging, retail, office space, transportation, laundry, private educational institutions¹, warehouse and storage, waste management and services, amusement, and miscellaneous. Public hospitals, universities, and water agencies are considered “public” customers and are covered in the public sector chapter.

¹ Excluding K-12 schools, which are captured in the public sector analysis because of the difficulty in separating out the public vs. private school K-12 data.

1. Customer Landscape

a. Natural Gas Consumption

Table A.1: SoCalGas - Customer Energy Usage		
Customer Size	2015 Number Customers	2015 Usage MM Therms
Large	1,271	291,675,227
Small (<50k therms)	10,538	222,257,379
Micro (<12k therms)	159,705	244,314,172
Total	171,514	758,246,778

Commercial Sector Energy Usage

SoCalGas has approximately 181,000 commercial customers that collectively consume nearly 758,250,000 million therms of natural gas annually as shown in Table A.1. In recent years, the SoCalGas commercial sector has remained relatively stable, and has strongly recovered since the economic recession of 2008-2009.

Commercial customers primarily use gas for water heating, cooking, and space heating, as shown in Figure 1.1. The vast majority of SoCalGas' commercial accounts are small to medium-sized businesses that account for about 61% of the commercial sector energy usage annually, as shown in Figure 1.2.

Usage By Customer Size

SoCalGas has divided its commercial customers into three usage categories: Micro (0-12,000 therms per year), Small (12,000 to 50,000 therms per year), and Large (more than 50,000 therms per year). Most of SoCalGas' commercial customers fall into the Micro and Small categories as shown in Figure 1.3.

Figure 1.1: 2015 Commercial Usage by End Use

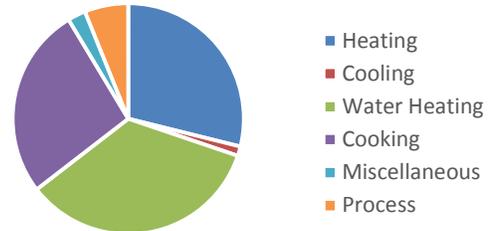


Figure 1.2: 2015 Commercial Usage by Segment

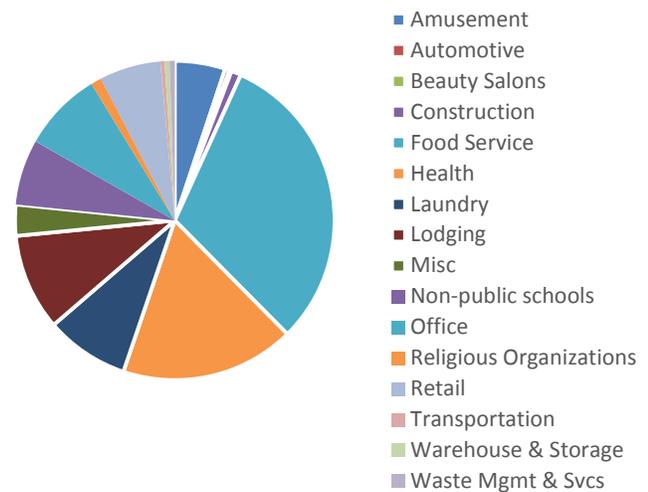
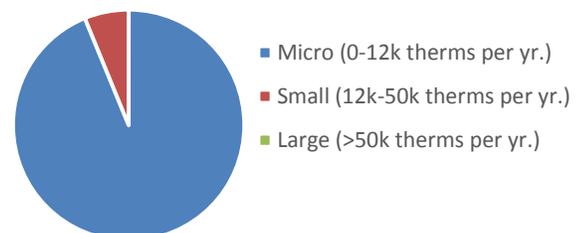


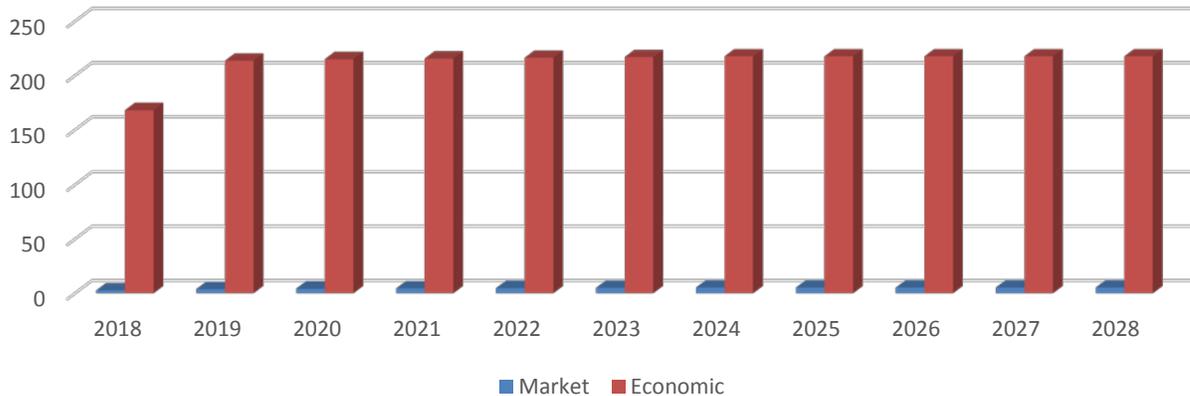
Figure 1.3: 2015 Commercial Usage by Customer Size



b. Market & Economic EE Potential

The estimated market and economic EE potential for total the commercial sector, over the next ten years, is shown in Figure 1.4. Historically, public sector customers have been included in the Commercial sector analyses (e.g., market potential studies). However, the public customers are addressed as part of the public sector business plan. As a result, Figure 1.4 removes the estimated public sector from the commercial EE potential.

Figure 1.4: EE Potential - Commercial - Market & Economic By Year



Historical Sector Performance

Segment

From 2010 to 2015, SoCalGas commercial customers saved 15,520,494 million therms of natural gas, or 2% of total annual commercial gas consumption. Commercial gas savings account for approximately XX% of SoCalGas' EE market potential during this time period.

The food service segment accounted for the largest portion of the commercial sector energy savings with 3,318,110 million therms saved from 2010 to 2015, as shown in Figure 1.5. Process heating and food service end-uses account for the largest portion of energy savings during this same period.

Figure 1.5: 2010-2015 Commercial Energy Savings by Segment

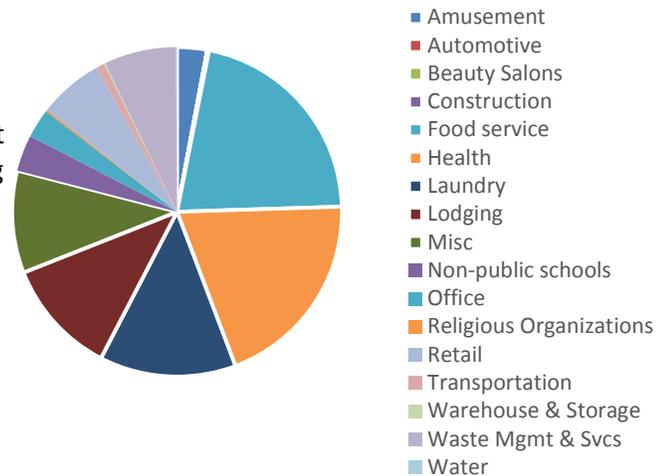
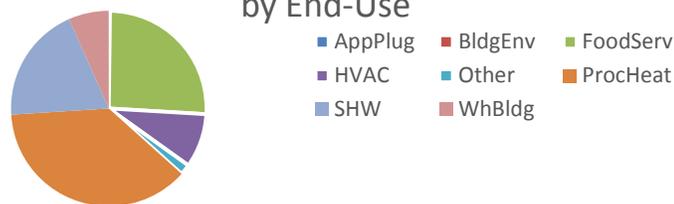


Figure 1.6: 2010 - 2015 Commercial Energy Savings by End-Use



zEnd-Use

Figure 1.6 depicts annual energy savings of the commercial sector by end use. Approximately (30%) of the energy savings are associated with Process Heating, followed by Cooking/Food Service (25%). The majority of commercial sector energy efficiency savings results were produced through the State Wide Calculated program. The majority of energy savings processed through the State Wide Calculated program came from the end uses Process Heating, and HVAC.

2. Market Intelligence

Energy Efficiency Equipment Sales Share

Due to the diverse segments within the commercial sector, there is not common equipment used across the sector. Similar equipment is common within each of the segments within the commercial sector. Market adoption levels of EE equipment vary among segments and equipment. In the food service segment, the primary EE equipment, fryers and ovens, have achieved significant market adoption levels. In contrast, these same measures have very low adoption levels in other active segments such as healthcare and lodging.

In order to increase the purchase of EE equipment to realize the permanent market effect, SoCalGas will place a heavy focus on increasing market adoption of EE equipment where market adoption is low.

Key Market Actors

In order to increase market adoption of EE equipment in the commercial sector, there are key market actors that can assist in transforming the market through the various program and policy intervention strategies. The market actors include equipment manufacturers, distributors, and retailers to assist in permanently modifying equipment stocking habits as well as customer perception and acceptance of EE equipment. Other market actors include influential industry associations that can inform and influence specific-customer segments within the commercial sector.

3. Industry Trends

Southern California, and specifically, the SoCalGas service area, includes a very large commercial market due to the large, vibrant and diverse southern California economy. The economy ranks as one of the top economies in the world. SoCalGas has approximately 171,000 commercial customers that collectively consume almost 0.8 billion therms of natural gas annually.

The SoCalGas commercial sector has largely recovered since the economic recession of 2008-2009. The vacancy rate of commercial real estate, a key economic indicator, has steadily declined. The overall vacancy rate for the Greater Los Angeles region decreased during from 15.8% in the first quarter of 2015 to 15.1% in the first quarter of 2016.

Key trends in the commercial market within southern California include:

Employment. Employment gains have been made at a slower pace, with continued improvement in local unemployment rates.

Leading industries. Health care and social assistance; professional and business services; retail trade; and leisure and hospitality.

Legislative Mandates. There are several legislative mandates levied upon various commercial customers to promote deeper EE retrofits (See section 4.a.).

Recession Continues in Rural Communities. Recent economic studies project rural communities in California, especially in the San Joaquin Valley, will continue to have sluggish economies - in contrast to other areas within the state.

4. Sector Influences

a. Applicable Legislation and Regulatory Directives

There are a number of newly adopted legislative bills providing specific guidance for the future of energy efficiency in California. From Senate Bill (SB) 350 to Assembly Bills (AB) 793, 758 and 802, there are numerous directives that are helping to shape the next generation of energy efficiency program offerings. SB 350 sets forth a goal to double the levels of energy efficiency in California by 2030. With this goal set, a number of legislative and regulatory directives are provided to SoCalGas, and other program administrators, to help shape the energy efficiency business plans. The CPUC has also issued guidance to program administrators on how to further formulate the energy efficiency business plans. In response, SoCalGas has reshaped existing program strategies and added new ones to meet these specific directives. A summary of the recent legislative and regulatory directives along with SoCalGas' proposed program strategies to address these directives are detailed in Appendix B.

b. EM&V Study Recommendations & Observations

The evaluation, measurement, and verification (EM&V) process includes a number of commercial sector-related market studies, load impact, programs, process evaluations, and potential studies on energy efficiency programs and market segments.

The commercial sector business plan incorporates, with and without modifications, various recommendations that have not already been incorporated into the existing energy efficiency programs. A list of referenced EM&V studies directed at the commercial sector is provided in Appendix C of this chapter.

c. External Stakeholder Input

As part of the EE business planning process, SoCalGas received valuable input from various external stakeholders primarily through the California Energy Efficiency Coordinating Committee (CAEECC). The stakeholder input, in part, helped shape the program strategies offered in the business plan. Specific CAEECC recommendations and corresponding responses are shown in Appendix D of this business plan chapter.

C. Vision, Goals, Objectives and Sector Strategies

The commercial sector vision, goals, and objectives set the tone and direction for the next generation of program offerings. It is vitally important that they are clear, concise and connected to California's overall energy efficiency vision. The commercial sector business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape the commercial sector vision. The business plan has a number of other influences including: Commission policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input, and program experience.

The commercial sector goals and objectives were borne from the energy efficiency business planning efforts and reflect the areas of focus needed to achieve the sector vision. In addition, sector-specific

tactical objectives are provided to set clear and tangible tasks that support the sector goals and objectives. Over time, the goals and corresponding objectives may be reset to adapt to changes in the public sector, regulatory policies, laws, and customer response to program offerings.

1. Commercial Sector Vision

New commercial buildings will realize the highest natural gas efficiency levels to support a pathway to zero net energy by 2030 for all new and a substantial proportion of existing buildings. Innovative technologies, enhanced building design, and operation practices (HVAC) will dramatically grow in use in the coming years through a combination of comprehensive whole building programs, technology development, market pull, professional education, and targeted financing and incentives.

2. Commercial Sector Goals

- Enable new construction to achieve the highest natural gas energy efficiency levels in conjunction with achieving zero net energy performance.
- 50% of existing buildings will be zero net energy ready buildings by 2030 through achievement of deep levels of natural gas energy efficiency.

3. Commercial Sector Objectives

- **Increase EE adoption levels for commercial customers with high EE potential through efficient outreach and effective offerings.** Deliver effective, low touch customer solutions by leveraging data analytic techniques to targeted customers to increase energy efficiency in commercial business operations.
- **Increase EE levels in the commercial leased properties by reducing the split-incentive market barrier.** Align the interest of owner and renter to adopt higher levels of EE in the commercial leased facilities.
- **Support standardization of ZNE definition and eligibility for new construction and retrofitted buildings and increase number of ZNE-ready buildings across most commercial segments through increased gas energy efficiency levels.**
- **Support the proper installation, maintenance, and use of HVAC systems in the commercial sector.** Partner with electric utilities and key market actors to offer a simplified suite of programs that capture and recognize all realized HVAC-related EE savings.

4. Commercial Sector Tactical Objectives

- i. Encourage commercial customer to engage in comprehensive energy efficiency solutions, leveraging pay for performance strategies to incent market actors coupled with simple M&V approaches.
- ii. Simplify program requirements to facilitate ease of program participation while maintaining appropriate safeguards.
- iii. Educate commercial customer on energy and operational benefits as well as encourage customers to optimize and incorporate O&M actions to increase measureable energy efficiency.
- iv. Create industry benchmarks for individual segments (facility type, customer size) to inform and demonstrate EE benefits to customer segment.
- v. Motivate large commercial leadership to champion energy efficiency and incorporate it as a key consideration into business operation decision-making.
- vi. Clarify and refine ZNE definition to promote natural gas energy efficiency.

- vii. Create data analytic methods to efficiently identify facilities with higher EE potential and provide tailored energy assessment for customer leadership that will encourage customer to make immediate EE behavioral changes and near-term retrofits.
- viii. Train facility staff to create in-house expertise to develop permanent EE practices, improved process efficiency, and on-going benchmarking monitoring.
- ix. Collaborate with industry to identify emerging and renewed EE technologies, increase adoption levels, and improve the customer adoption of proper HVAC installation and maintenance practices.
- x. Collaborate with financial market actors to enhance financing options for small commercial customers.
- xi. Collaborate and partner with other utilities and agencies to offer comprehensive programs and services that lower delivery costs and improve customer access.

D. Program Intervention Strategies & Delivery

Since the 1990s, California has embraced the notion that energy efficiency program intervention strategies, coupled with government intervention (e.g., public policies and laws), can permanently reduce market barriers so customers can achieve higher levels of energy efficiency. In a transformed market, customers will naturally adopt higher levels of energy efficiency without the need for such program and government interventions. All programs, resource and non-resource, contribute, in some way, to reducing market barriers in order to achieve the desired, long-lasting market effects.² The current CPUC market transformation definition is stated below:

“Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.”³

To identify the appropriate program strategies, the business plan identifies sector-specific problem statements with corresponding resolutions or desired outcomes. Sector-specific program strategies are presented that will reduce current market barriers. Program delivery will rely on a combination of third party delivered statewide and local programs. These programs will be supplemented with SoCalGas support that will enable third party program implementers and customers to work together. The business plan also identifies key sector-level metrics that will track the progress towards achieving the desired outcomes, as presented below.

² “Market transformation is not a label that uniquely identifies certain energy efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees.” [A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel]

³ D.09-09-047, pp. 88-89.

1. Problem Statements & Market Barriers

a. Problem Statements

The commercial sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engage the commercial customer to achieve both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

1. Varied and unique segments with specific needs make it difficult to offer standard program that fits the needs of all customers.
2. The commercial sector is trending towards more leased properties creating a larger split incentive barrier between owners and tenants.
3. There is builder confusion on how to achieve ZNE in new construction and retrofitting of commercial buildings.
4. Improper HVAC replacement and maintenance of equipment limits the potential for significant energy savings.

b. Market Barriers

There are several market barriers present within the same market that inhibit the customer from achieving higher levels of energy efficiency. Market barriers are a byproduct of the market sector characteristics and the customer’s behavior within that specific market sector. Program strategies are temporary interventions introduced into the market sector to reduce these market barriers to create real, lasting market changes.

The following are perceived market barriers, specific to the commercial sector, identified during the business planning process. Specific examples related to each market barrier are provided.

Table D.1: Perceived Market Barriers

<p>High First Cost</p>	<p>Zero Net Energy (ZNE) is cost-prohibitive. The incremental time and cost of additional design/labor to achieve ZNE for both new and retrofit whole building projects is not currently feasible for the commercialization of ZNE. The customer business model is not structured to incorporate the ZNE building standards. The businesses operating within ZNE buildings want to ensure an increase in employee productivity and that their buildings will operate better than “normal buildings.”</p>
<p>Split or Displaced Incentive</p>	<p>Split incentive among tenant and owner. The decision tree of the owner/tenant to retrofit a space is complicated. The tenant wants to improve the space, like upgrading HVAC and the envelope, to increase productivity/comfort and/or increase business ROI through increasing energy efficiency. This can also be vice versa, in which the owner wants to make the improvement.</p> <p>There are displaced incentives between commercial property owners and tenants. Program design and policy require the benefits goes to the entity that is recorded as the meter owner. Program design does not consider the implications to the asset manager, tenants, property managers, design team, and building owner should they differ from the meter owner.</p>

Table D.1: Perceived Market Barriers

<p>Organizational Practices or Customs</p>	<p>Renewal of lease agreements and the capital planning extend beyond program cycles. In most cases, the building’s capital plan and the new lease agreement are already planned in advance of the program design and marketing catches up to the owners’ intentions to retrofit. The PA’s ability to foster assistance is greatly reduced because the market segment’s planned actions were planned ahead of time.</p> <p>Customers pursuing sustainability over energy efficiency solutions. Designers and owners now look at a more holistic approach to buildings to increase their return on investment on new construction. These holistic approaches include water efficiency, thermal comfort, health, and productivity. The building developers are focused on sustainability attributes rather than EE.</p>
<p>Diffused Market</p>	<p>Smaller customers are diverse and spread throughout large service territory. The smaller commercial customer markets are very diverse and geographically spread throughout in the territory. This limits program participation and, ultimately, lower levels of EE adoption. For example, on an annual average, the commercial restaurant program only has about 1% of the total market participants enrolled.</p>
<p>Information or Search Costs</p>	<p>Smaller customers do not have time or resources to learn about EE programs and opportunities. Limited access to EE opportunities coupled with the limited effectiveness of mass market programs that do not cater to any particular segment create lower participation levels and EE adoption levels among smaller and rural customers.</p> <p>Whole Building Approach. The whole building approach currently requires improvement within the development of ZNE buildings. There is opportunity to improve the integration of different professional subject matter experts through the design process of the building. The inclusion of whole building solutions vs. equipment replacement is not prominent yet due to value engineering, or cost cutting. In addition, there should be a differentiation of whole building solutions applied to New Construction versus Retrofit opportunities.</p>
<p>Asymmetric Information and Opportunism</p>	<p>Customer presented with varied and disconnected information regarding HVAC solutions. Various market actors promote their own respective interest in the HVAC industry. These actors include independent manufacturers, distributors, retailers, union and non-union contractors, jurisdictions/codes etc. This notion is further evidenced through the ongoing efforts of the Western HVAC Performance Alliance (WHPA), which has been trying for several years now to align all these industry pieces towards a common EE purpose.</p>
<p>Service Unavailability</p>	<p>HVAC industry skill gaps. HVAC certifications are widely regarded as non-essential or secondary to field experience, and although many HVAC contractors value workforce education and training, many are not willing to invest in their staff.</p>
<p>Performance Uncertainties</p>	<p>Customers are uncertain of claimed benefits associated with energy efficiency equipment. Limited lab testing creates a sole reliance on engineering work papers to estimate energy savings. EM&V challenges including research design issues, lab simulations, and challenges obtaining representative field data have impeded program implementation and cost-effectiveness. Not enough work has been completed to measure and validate the energy savings generated by the programs. Typically, deemed energy savings (work papers) are the only marker to value the EE savings and corresponding benefits.</p>

2. Desired Sector Outcome

A market effect is a permanent change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).⁴ The sector business plan identifies key milestones in the advancement towards a permanent market effect through a set of desired sector outcomes. In many cases, the desired outcome is expected well beyond the near and mid-term planning horizon, and ties to the 10-year vision for the sector. The business plan identifies the corresponding program intervention strategies that will be deployed to reduce the market barriers, which will result in the desired sector outcome.

Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
Varied and unique segments with specific needs make it difficult to offer standard program that fits the needs of all customers.	High adoption of EE solutions by commercial customers	Increase adoption of EE solutions by customers within untapped EE potential across all customer segments and sizes.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Business Outreach • Strategic Energy Mgmt. • Customer Incentives • Direct Install • Midstream EE Equipment • Commercial Financing • Emerging Tech. Promotion 	Increase in levels of EE economic potential.
The commercial sector is trending towards more leased properties creating a larger split incentive barrier between owners and tenants.	High adoption of EE solutions by commercial leased properties	Increased EE levels in EE in commercial leased properties.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Business Outreach • Strategic Energy Mgmt. • Customer Incentives • Direct Install • Midstream EE Equipment • Commercial Financing 	Increase in EE levels of commercial leased properties.
There is builder confusion on how to achieve ZNE in new construction and retrofitting of commercial buildings.	High adoption of EE to increase the number of ZNE-ready commercial buildings	Increase number of ZNE-ready buildings across most commercial segments through increased gas energy efficiency levels.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Business Outreach • Strategic Energy Mgmt. • Customer Incentives • Direct Install • Midstream EE Equipment • Commercial Financing 	Increase in number of ZNE-ready commercial building stock.

⁴ A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel, p. 9

Table D.2: Market Sector Overview: Commercial Sector

Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
<p>Improper HVAC replacement and maintenance of equipment limits the potential for significant energy savings.</p>	<p>Increased installation and improved maintenance of HVAC systems</p>	<p>Increase the number of properly installed and maintained HVAC systems.</p>	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Business Outreach • Strategic Energy Mgmt. • Customer Incentives • Direct Install • Midstream EE Equipment • Commercial Financing 	<p>Increase in EE savings achieved in HVAC area.</p>

DRAFT

Figure 1: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME: Increase adoption of EE solutions by customers within untapped EE potential across all customer segments and sizes.</p>	<p>High First Cost: Zero Net Energy (ZNE) is cost-prohibitive.</p>	<ul style="list-style-type: none"> Customer incentives Direct Install Midstream EE Equipment Strategic Energy Management Financing
	<p>Split Incentive: Split incentive among tenant and owner. There are displaced incentives between commercial property owners and tenants.</p>	<ul style="list-style-type: none"> Direct Install Small Business Outreach Partnering
	<p>Organizational Practices: Renewal of lease agreements and the capital planning extend beyond program cycles. Customers pursuing sustainability over energy efficiency solutions.</p>	<ul style="list-style-type: none"> Strategic Energy Management Partnering Intelligent Outreach
	<p>Diffused Market: Smaller customers are diverse and spread throughout large service territory.</p>	<ul style="list-style-type: none"> Partnering Intelligent Outreach Small Business Outreach
	<p>Information Cost: Smaller customers do not have time or resources to learn about EE programs and opportunities. Whole building approach requires expertise.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Business Outreach
	<p>Asymmetric Information: Customer presented with varied and disconnected information regarding HVAC solutions.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Business Outreach
	<p>Performance Uncertainties: Customers are uncertain of claimed benefits associated with energy efficiency equipment.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Business Outreach

Figure 2: Market Barriers & Program Intervention Strategies

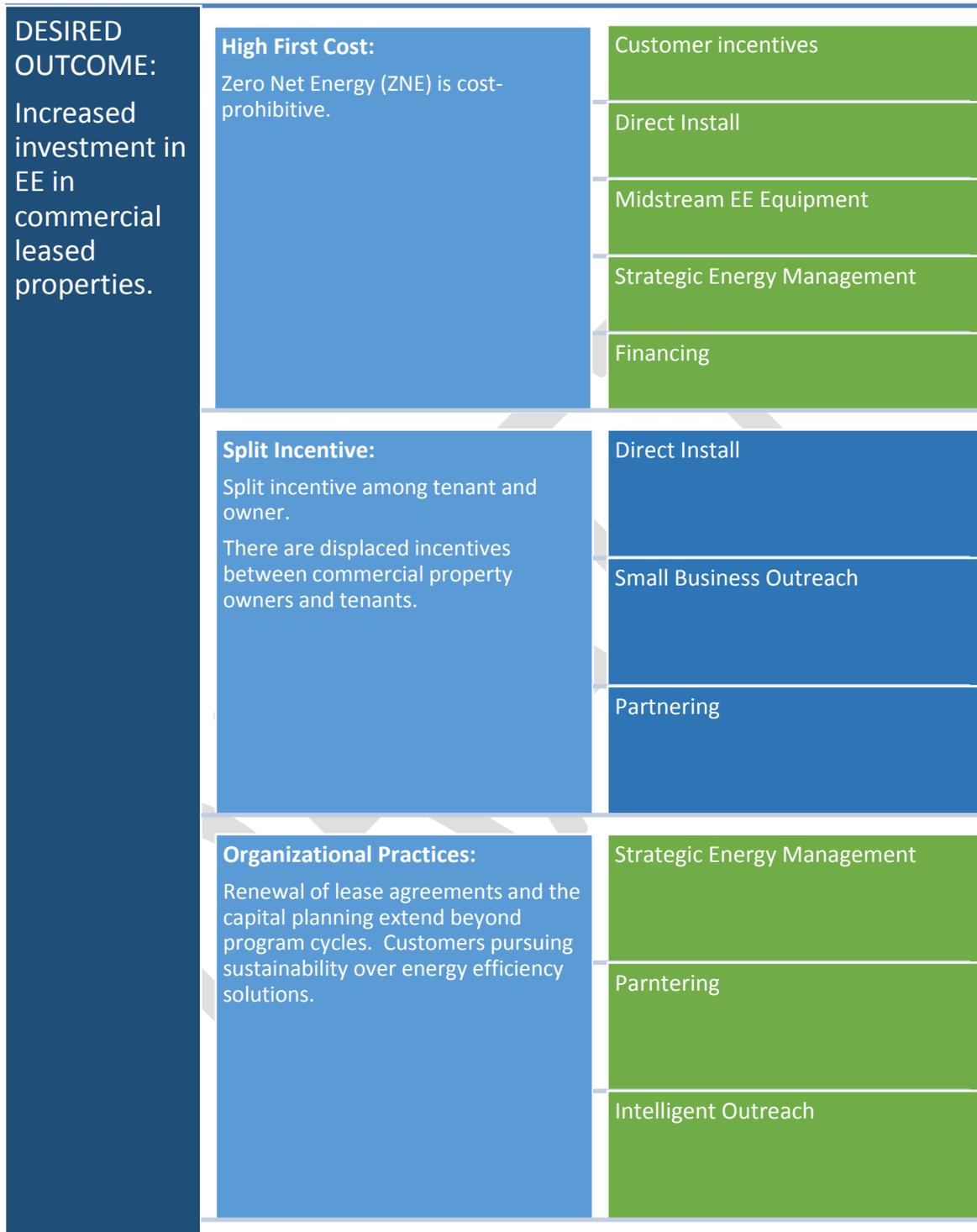


Figure 3: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME:</p> <p>Create clear and consistent ZNE definitions and requirements while realizing a significant number of ZNE buildings across most commercial segments.</p>	<p>High First Cost:</p> <p>Zero Net Energy (ZNE) is cost-prohibitive.</p>	<p>Customer incentives</p>
		<p>Direct Install</p>
		<p>Midstream EE Equipment</p>
		<p>Strategic Energy Management</p>
		<p>Financing</p>
	<p>Organizational Practices:</p> <p>Renewal of lease agreements and the capital planning extend beyond program cycles. Customers pursuing sustainability over energy efficiency solutions.</p>	<p>Strategic Energy Management</p>
		<p>Partnering</p>
		<p>Intelligent Outreach</p>
	<p>Information Cost:</p> <p>Smaller customers do not have time or resources to learn about EE programs and opportunities. Whole building approach requires expertise.</p>	<p>Intelligent Outreach</p>
		<p>Partnering</p>
		<p>Small Business Outreach</p>
	<p>Performance Uncertainties:</p> <p>Customers are uncertain of claimed benefits associated with energy efficiency equipment.</p>	<p>Intelligent Outreach</p>
		<p>Strategic Energy Mgmt.</p>
		<p>Small Business Outreach</p>

Figure 4: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME: Proper HVAC replacement, maintenance and usage of HVAC systems.</p>	<p>High First Cost: Zero Net Energy (ZNE) is cost-prohibitive.</p>	<ul style="list-style-type: none"> Customer incentives Direct Install Midstream EE Equipment Strategic Energy Management Financing
	<p>Split Incentive: Split incentive among tenant and owner. There are displaced incentives between commercial property owners and tenants.</p>	<ul style="list-style-type: none"> Direct Install Small Business Outreach Partnering
	<p>Organizational Practices: Renewal of lease agreements and the capital planning extend beyond program cycles. Customers pursuing sustainability over energy efficiency.</p>	<ul style="list-style-type: none"> Strategic Energy Management Partnering Intelligent Outreach
	<p>Diffused Market: Smaller customers are diverse and spread throughout large service territory.</p>	<ul style="list-style-type: none"> Partnering Intelligent Outreach Small Business Outreach
	<p>Information Cost: Smaller customers do not have time or resources to learn about EE programs and opportunities. Whole building approach requires expertise.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Business Outreach
	<p>Asymmetric Information: Customer presented with varied and disconnected information regarding HVAC solutions.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Business Outreach
	<p>Service Unavailability: HVAC industry skill gaps.</p>	<ul style="list-style-type: none"> Partnering
	<p>Performance Uncertainties: Customers are uncertain of claimed benefits associated with energy efficiency equipment.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Business Outreach

3. Program Intervention Strategies

To realize the desired sector outcomes, several coordinated and integrated program intervention strategies will be deployed throughout the various market channels to increase customer EE adoption levels. This will support the achievement of increases in the adoption of EE products and behavioral practices. The expected outcome, corresponding sector metric, market barriers, and program intervention strategies are summarized below and grouped by the sector's problem statements. A detailed description of each program strategy follows these summaries.

The commercial sector represents several unique customer segments that vary in size and type of operations. The key characteristics of the commercial sector include:

- Diffused market sector with a number of unique and varied customer segments;
- Small number of large customers who consume the vast majority of natural gas;
- Large number of smaller customers who use gas similar to a residential customer; and
- Significant amount of untapped energy savings associated with changes in customer operations and practices.

Due to the limited natural gas usage within this segment and the need to simplify customer engagement in the delivery of DSM programs, SoCalGas proposes to coordinate program delivery with local utilities (electric, water), where practicable. This will allow for a single customer engagement and will empower the customer to implement a complete energy (and water) efficiency plan.

In certain instances, a customer may behave in a manner similar to those in other sectors. For example, a commercial retail customer may also act as an industrial processing plant in a shared facility. In those instances, strategies from various sectors will be offered to these multi-dimensional customers in a coordinated offering.

The following is a comprehensive list of program intervention strategies that will be directed at SoCalGas' commercial sector. The strategies are intended to overcome the various market barriers identified in this business plan to achieve permanent market effects. These strategies will be deployed in a cohesive manner at various stages during the execution of the business plan.

Upon Commission approval of this business plan, future implementation plans will be presented describing the specific program within these program intervention strategies. Overall, the program intervention strategies are intended to:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services;
- Cultivate, promote and sustain lasting energy-efficient operations and practices; and
- Meet customer's energy efficiency adoption preferences through a range of simplified offerings that address the customer's energy efficiency needs.

Table D.3: Program Strategies by Customer Size: Commercial Sector
Summary: Program Interventions Strategies Across Customer Size

Intervention Strategies	Status	Micro	Small	Medium	Large
Partnering					
• Utility Partnering	Existing	X	X	X	X
• Industry Partnering	New	X	X	X	X
• Customer Partnering	New			X	X
Intelligent Outreach					
• Data Analytics	New	X	X	X	X
• Virtual Engagement	New	X	X	X	X
• Facility Energy Advisor	Existing	X	X	X	X
• Energy Management Technology	New	X	X	X	X
• Industry EE Best Practices	New	X	X	X	X
Small Business Outreach	New	X	X		
Technical Assistance	New	X	X	X	X
Strategic Energy Management	New			X	X
Customer Incentives					
• Pay-for-Performance	New	X	X	X	X
• Customized Incentives	Existing		X	X	X
• Deemed Incentives	Existing	X	X	X	X
• Bundled Measures	Existing	X	X	X	X
• Whole Building	Existing	X	X	X	X
Retrocommissioning (RCx)	Existing	X	X	X	X
Direct Install					
• Direct Install	Existing	X	X	X	X
• Comprehensive DI	New	X	X	X	X
Midstream EE Equipment	Existing	X	X	X	X
Commercial Financing	Existing	X	X	X	X
Innovative Design	Existing	X	X	X	X
Crosscutting Coordination					
• Emerging Technologies	Existing	X	X	X	X
• Codes & Standards	Existing	X	X	X	X
• Workforce Education Training	Existing	X	X	X	X

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Partnering				Limited-partnership arrangements, deployed on an as needed basis that are intended to: increase the number of customers adopting energy efficiency; promote deeper, comprehensive energy efficiency; simplify customer engagement; and reduce program costs through a cost-sharing partner model based on equitably sharing of customer incentives and administrative costs among partners.
<ul style="list-style-type: none"> • Utility Partnering 	Existing	NR	Near, Mid-term	Facilitates the co-delivery of key program intervention strategies among gas and electric investor-owned utilities, publicly-owned utilities, program administrators, and water agencies.
<ul style="list-style-type: none"> • Industry Partnering 	New	NR	Near, Mid-term	Partnering will also be deployed, on an as needed-basis, among industry associations to promote EE solutions to a represented customer group.
<ul style="list-style-type: none"> • Customer Partnering 	New	NR	Near, Mid-term	Partnering with larger property owners to create EE action plans as part of the customer’s property management plans.
Intelligent Outreach				To assist customers in identifying the greatest EE opportunities, improve cost efficiency in program delivery, segment-specific benchmarking and provide deeper, comprehensive energy savings solutions.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Data analytics 	New	NR	Near, Mid-term	Leverage AMI data to quickly and efficiently target facilities with the highest EE potential for customer. This will assist in encouraging the uninterested commercial customer with the opportunity for immediate and direct financial benefits by incorporating energy efficiency into their operations. Benchmarking by segment and size will be a key element to this strategy.
<ul style="list-style-type: none"> Virtual energy audits 	New	R	Near, Mid-term	As a result of data analytics, energy audits will be able to recommend both optimization and O&M measures to decision-makers and facilities staff. O&M and optimization EE opportunities will be presented to facility staff to implement for immediate and persistent energy savings along with necessary training and education to permanently change the customer’s behavior. Consumer-friendly, on-going communication to inform the customer on their progress in maintaining and/or increasing EE levels within their facilities.
<ul style="list-style-type: none"> Facility energy audits 	Existing	R	Near	Offers onsite comprehensive assessments to identify EE opportunities and traditional data driven interactive tools designed to engage and motivate customers to reduce their energy consumption through customized program recommendations.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Energy management technology 	New	R	Near-term	<p>Leverages emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and management technologies to permanently modify customer behavior, which will result in reliable energy efficiency savings. These technologies will also focus on appliances that can assist the customer to manage their energy, including proper maintenance of appliances (e.g., HVAC self-diagnostic technology) to achieve optimal efficiency. Where practicable, the strategy will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency experience.</p>
<ul style="list-style-type: none"> Sharing EE best practices 	New	NR	Near, mid-term	<p>Offers, along with industry groups, a collaborative forum to help inform, excite, and accelerate EE actions among like customers.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Small Business Outreach	New	NR	Near-term	Targets small and medium-sized customers by applying data analytics, including a focus on rural and non-English speaking business owners, to help the customer understand how specific energy efficiency equipment retrofits (e.g., boilers), O&M, and optimization EE changes, based on their own unique energy usage profile, can improve their business operations. . The small commercial outreach strategy, in concert with the data analytics strategy, will group these customers accordingly and approach them differently. The larger consuming small business customers will be approached with similar program strategies as the larger commercial customer along with a more comprehensive direct install offering. The small consuming commercial customer typically uses natural gas similar to a residential customer (e.g., water and space heating). As such, the appropriate residential program strategies will be directed at these lower energy-consuming customers.
Technical Assistance	Existing	NR	Near-term	Technical assistance is an information strategy focused on educating and training key facility personnel on EE practices and providing supplemental technical assistance in EE project development and implementation.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Strategic Energy Management (SEM)	New			SEM is a program intervention strategy proven in achieving deeper and permanent energy efficiency levels in the commercial sector through improved customer operations and maintenance practices and EE equipment installations. SEM provides long-term consulting services for educating and training participating businesses' staff to do the following: (1) develop and implement a long-term energy planning strategy; and (2) permanently integrate energy management into their business planning at all organizational levels, from the shop floor to corporate management.
Customer Incentives				Facilitates customer choice by offering a simplified suite of financial incentives strategies to customers (and/or their ESCO) to reduce the high first cost barrier, the key market barrier for most customers. Although incentive-based strategies like pay-for-performance appeal to larger EE projects, in many circumstances, the deemed and customized incentive one-payment strategies are very effective in motivating the customer to install EE equipment. The following strategies will be offered in combination with other program strategies to encourage deeper, more comprehensive energy efficiency solutions and permanent EE behavior modification.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> • Pay-for-Performance 	New	R	Near-term	<p>A strategy that targets more comprehensive EE projects. Customers will be encouraged to work with ESCOs, if needed, to participate in a pay-for-performance (P4P) strategy. The P4P strategy will provide for incentive payments to the participating customer over a pre-determined time period on preset payment intervals based on measured savings, using normalized meter data, with a baseline of existing conditions associated with O&M and behavioral actions and equipment retrofits.</p>
<ul style="list-style-type: none"> • Customized Incentives 	Existing	R	Near-term	<p>A strategy that offers financial incentives for customized retrofit EE projects. The program offering features incentives based on calculated energy savings for measures installed, as recommended by comprehensive technical and design assistance for customized retrofits and new construction. It offers a calculation method that can consider system and resource interactions, to support an integrated, whole system, and multi-resource management strategies.</p>
<ul style="list-style-type: none"> • Deemed Incentive 	Existing	R	Near-term	<p>A strategy that offers financial incentives based on predetermined energy savings. It also features rebates per unit measure for installed energy-saving projects and provides the IOU, equipment vendors, and customers a simple transaction and encourages greater market adoption of emerging EE technologies and applications.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> • Small Commercial Bundled Measures 	New	R	Near-term	<p>This strategy provides an integrated approach of bundling various measures together to provide an all-inclusive solution to the customer based on their profile (segment, size, energy usage) - primarily for small/medium-sized customers. The bundled strategy will integrate education, financing, and technical assistance in support of the installation of EE measures.</p>
<ul style="list-style-type: none"> • Whole Building 	Existing	R	Near-term	<p>A process that views the building as a system, rather than collection of components, in which each system interacts with each other systems such as HVAC, the building envelope, and lighting. This strategy is also directed at the new construction segment by promoting integrated design through owner incentives, design team incentives, and design assistance to participants who design spaces that are energy efficient.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Retrocommissioning (RCx)	Existing	R	Near-term	Assist customers in reducing their operating costs through cost-effective energy savings, focused on the identification and implementation of low-cost / no-cost operational improvements and on optimizing how existing equipment operates as an integrated system. The strategy will rely on a combination of data analytics and metered interval data to identify O&M repair and optimization opportunities to increase energy efficiency of a facility. The strategy will typically be offered in tandem with other program strategies (e.g., Intelligent Outreach, Comprehensive direct install, etc.) to simplify customer engagement and to efficiently deliver complete EE solutions to customers.
Direct Install				Offers a standard direct install (DI) strategy targeted primarily at small/medium-sized customers that will deliver natural gas energy efficiency solutions, with electric and water efficiency, where feasible, to achieve near-term measurable results. A comprehensive direct install (CDI) tactic will extend beyond the standard DI offering achieve deeper, more comprehensive EE equipment retrofits. CDI will rely, in part, on ratepayer funds and leverage customer co-fund contributions and/or customer financing.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Standard Direct install 	Existing	R	Near-term	Targets small/medium-sized customers by leveraging the intelligent outreach strategy that will identify facilities with the greatest EE opportunity. The standard direct install offering will provide limited list of low/no cost EE measures. DI will install natural gas EE measures along with other similar electric and water efficiency measures, where practicable.
<ul style="list-style-type: none"> Comprehensive Direct Install 	New	R	Near-term	Encourages deeper energy savings by offering more comprehensive EE measures that are typically used by the targeted customer segment. CDI will offer qualified contractors that will engage directly with the customers to install measures. A co-pay option will be offered to the customer along with tailored on-bill repayment strategy to offset the initial cost of the EE equipment.
Midstream EE Equipment	Existing	R	Near-term	Provides deemed incentives to manufactures and distributors that will be used to reduce the retail cost of natural gas EE equipment (e.g., tankless water heating). This offering will be coupled with a comprehensive, co-pay direct install strategy that can effectively deliver on-demand installation by trained and qualified contractors.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Commercial Financing	Existing	NR	Near-, Mid-term	Relies upon various financing vehicles including on/off bill repayment solutions to encourage customers to adopt deeper, more comprehensive energy efficiency solutions. For smaller customers, financing solutions will be encouraged to offset customer’s financial contribution (e.g., co-pay) for an EE retrofit, such as comprehensive direct install, to overcome customer financial barriers.
Innovative Design	Existing			Will solicit for large-budget program designs to reach deeper levels of energy efficiency in various segments within the sector. The solicitations will be continuously offered through the Innovative Design for Energy Efficiency Application (IDEA365) solicitation in search of ways to capture EE savings in various segments within the sector.
Crosscutting				
Emerging Technology Introduction				Actively introduce EE technology solutions that will be applicable to the customer sector and achieve customer adoption including a focus on technologies that can be used by small/medium customers.
<ul style="list-style-type: none"> • Scaled Field Placement 	Existing	R	Near, Mid-term	Deliver scaled field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable commercial customers.

Table D.4: Program Intervention Strategies				
Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Demonstration Field Placement 	Existing	NR	Near, Mid-term	Conduct selective demonstration field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable commercial customers.
Codes & Standards	Existing	NR	Near, Mid-term	C&S will work with the commercial sector customers and contractor community to increase awareness of new codes and to support code compliance.
Workforce Education & Training	Existing	NR	Near, Mid-term	WE&T will provide classes, seminars, consultations, and demonstrations to support commercial customer and contractor training and awareness of EE technologies, quality installation, and code compliance. WE&T will also assist large commercial property owners (and their staffs) by providing technical education and/or in-field training to help property owners convert interest into EE actions.

Note: R=Resource; NR = Non-resource

4. Program Delivery

Individual programs will be designed and delivered by third party providers and SoCalGas based upon the program intervention strategies presented in the commercial sector business plan. Some programs will be designed and delivered through a statewide program implementer under contract by a lead program administrator. Other programs will be designed and delivered by third party implementers at a local or regional level. In some cases, SoCalGas will leverage its natural position with its customer to effectively deliver programs. In addition, SoCalGas will support the program delivery by leveraging existing resources (customer account representatives) to assist the customer and third party program implementers in the identification and implementation of specific customer projects. During the transition to new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market for a limited time.

a. Statewide Implementation

SoCalGas will collaborate and coordinate with other program administrators on the effective implementation of statewide program offerings. Programs designed to engage directly with specific market actors at the midstream and upstream market channels will be implemented on a statewide basis. Other downstream programs, beyond what is presented in the business plan, may also be considered candidates for statewide implementation throughout the duration of the business plan.

b. Third Party Implementation

Local and regional solutions are necessary for the achievement of the commercial sector vision, goals, and objectives. Many of the current programs offered are done so in coordination with publicly-owned utilities (POUs). Such partnerships with POUs will continue at a local level. For example, SoCalGas has a strong partnership with LADWP, the largest municipality in the nation, to jointly design and deliver EE programs to a shared customer base. Such activities will continue, whether implemented by the POU and/or implemented by SoCalGas-selected and managed third party program implementers. SoCalGas will also work with other POUs to identify good program candidates to join the statewide implementation efforts, where feasible.

c. IOU Implementation

SoCalGas proposes to continue implementation of certain downstream programs (i.e., programs delivered directly to the customer) where it is reasonable and practicable to do so. SoCalGas will also continue to actively support the delivery of third party programs. For example, customer services, such as incentive payments and inspections, will be provided to support third-party program implementers and to safeguard ratepayer funds. At times, it is more efficient and productive to leverage the natural relationship between SoCalGas and its customers. As the trusted energy advisor, SoCalGas has an ongoing relationship with its customers on all energy matters - including energy efficiency. SoCalGas proposes to continue to promote energy efficiency programs to their customers and customer groups in order to improve the likelihood that customers will adopt energy efficiency.

5. Performance Sector Metrics

To gauge sector progress towards the achievement of the desired sector outcomes, the business plan proposes key sector metrics. To properly monitor progress, the metrics will rely on data currently collected, tracked, and verified as part of the program administrator's data requirements (e.g., energy savings, customer participation, etc.). This approach improves the accuracy and timeliness of metric tracking while keeping the monitoring costs to reasonable levels. The industrial sector metrics associated with each problem statement are provided in Appendix A.

6. Key Partners

The success of the commercial sector business plan will rely on a positive, collaborative relationship with a number of market actors, program administrators, regulators and other government entities. Below is a list of key partners that will help SoCalGas successfully achieve the ambitious vision for the commercial sector.

Table D.5: Key Partners	
Key Partners	Support Activity
Program Administrators	<ul style="list-style-type: none"> • Deliver dual-fuel programs to reach more customers; • Leverage all available best practices and promote statewide consistency, where appropriate; • Simplify program engagement; • Capture all EE benefits including operational energy savings; and • Conduct market research that will identify and better understand unique barriers to energy efficiency investments.
Publicly-owned Utilities (POUs) and Water Districts	SoCalGas will actively coordinate with POUs and water agencies to effectively and efficiently deliver energy and water efficiency programs. SoCalGas will engage in partnership and co-delivery arrangements with POUs and water agencies when there is a shared customer base (gas and electric) to simplify the customer engagement and achieve higher levels of EE. SoCalGas will actively coordinate with POUs and water agencies throughout California and other regions to share best practices in program administration, design, and delivery.
California Public Utilities Commission and Key Stakeholders	SoCalGas will work with the Commission and other key stakeholder to investigate ways to simplify program requirements and to identify policies that will recognize all energy efficiency benefits associated with commercial sector EE programs.
Third Party Program Implementers	Solicit new and innovative programs from third party program implementers to address the commercial sector. Leveraging third party programs allows program administrators to draw upon creative program solutions that can be quickly and effectively targeted to these customers. Continued collaboration with program implementers throughout the program’s lifecycle will be an integral part of the program’s success.
Commercial Trade Organizations	Commercial trade organizations can provide an effective path to commercial sector collaboration, particularly by serving as a trusted source of information about business concerns facing specific commercial segments. Trade organizations have the ability to survey their membership to find common concerns and potential solutions. Understanding these concerns can help program administrators construct value propositions and tailor their program offerings to best serve these customers. Trade organizations have an established communications channels with the industry that can facilitate education of commercial customers about energy efficiency programs through a variety of forums, such as social and print media, ad hoc round tables, and monthly meetings as well as regional or national quarterly or annual meetings. SoCalGas will collaborate with trade allies to increase program promotion and customer awareness of the benefits of energy efficiency investments.
Industry Technical Community	Specialized technical assistance with expertise in specific commercial segments can be highly effective in identifying energy savings opportunities at commercial facilities. The expertise can be provided by resources that include utility in-house experts, independent technical consultants, and equipment vendors.
Equipment Vendor and Manufacturers	SoCalGas will actively work with equipment vendors and manufacturers to promote greater adoption of EE equipment among the various customer segments.

Table D.5: Key Partners	
Key Partners	Support Activity
California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) for financing	Financing will be a key program intervention strategy to overcome the high first cost of EE in the sector. SoCalGas will continue its long-term collaboration with CAEATFA to design and promote innovative financing strategies that will encourage greater customer investment in EE.

E. Statewide Program Coordination

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and very collaborative, on-going relationship among all implementers and program administrators. A detailed discussion will be presented in the final business plan, which will include a process by which administrators will consult and collaborate among each other to ensure effective statewide implementation across all service territories.

F. Crosscutting Sector Coordination

1. Local Marketing and Statewide Marketing, Education & Outreach Integration

The sector programs will rely on a combination of locally targeted promotion of specific energy efficiency programs tailored to the various segments throughout the sector. There will be a focus on historically underserved customers with higher EE potential, through data analytics, to encourage greater program participation.

Since the statewide Marketing, Education, and Outreach (ME&O) program’s short-term goal is focused on the mass market customer (i.e., residential and small business owners), the commercial sector will rely on the statewide ME&O program to inform small business customers on the importance of energy efficiency, their opportunities to act and the benefits of their actions. The commercial Small Business Outreach will provide customer-specific information and services to help the customer modify their energy consumption behavior and to install EE retrofits as well as promotion at a local level. The commercial sector program will also rely on targeted outreach efforts to inform larger commercial customers on the importance of energy efficiency, their opportunities to act, and the benefits of their actions. SoCalGas will actively participate in the both the development of the five-year ME&O Strategic Roadmap and Annual Joint Consumer Action Plans to coordinate program offerings with the statewide marketing efforts and to support the short and long-term goals of the ME&O program.

2. Workforce Education & Training Integration

The Workforce Education & Training (WE&T) is well positioned in its role of facilitating training on the skills needed by the workforce to perform the type, level and quality of work to reduce energy consumption and achieve the energy savings targeted by the State. WE&T will provide classes, seminars, consultations, and demonstrations to commercial customers, particularly emphasizing the options open to the food services segment at the SoCalGas Energy Resource Center test kitchens. WE&T

will also assist commercial customers (and their staffs) by providing technical education and/or in-field training to help the commercial customer convert interest into EE actions.

3. Emerging Technologies

There are emerging opportunities in the commercial sector that can capture previously-unavailable energy savings. Many of these opportunities lie at the convergence of new data streams, connected building systems, and advanced control strategies. Though challenging to bring together such a large number of new technologies and strategies, the EE community is beginning to explore the potential, particularly when multiple solutions can be bundled together into a single integrated measure. Further emerging opportunities lie in meter-based verification strategies that the statewide ETP is exploring. However, these advances may be outside the realm of interest or feasibility for some commercial customers, so the ETP will also continue to support a balanced portfolio that contains proven and effective “traditional” measures as well.

The convergence of data analytics, inexpensive connected building components, and evolving energy management tools have the combined potential to unlock new energy efficiency opportunities. This technological convergence will facilitate a new generation of EE programs that address systems or entire buildings, rather than just standalone widgets. These integrated energy management solutions can capitalize on many formerly disparate energy savings opportunities at once—a major benefit for business owners who are busy and for whom energy use is not necessarily a top priority. Furthermore, a building designed with the interaction of whole systems in mind can avoid such systems interfering with each other’s smooth operation and can provide non-energy benefits such as greater occupant comfort, increased productivity, or enhanced security—thus allowing utilities to potentially reach customers for whom energy is not a high priority.

To help facilitate adoption of new integrated solutions, the statewide ETP is investigating advanced meter-based verification approaches, which directly measure energy savings of facility upgrades (traditional methods typically can typically only offer an estimate based on field or laboratory testing). Thus, a meter-based approach offers utilities and commercial customers a more accurate picture of energy savings—particularly with complex, integrated systems—while also identifying unexpected performance issues.

For those businesses that are not a good fit for integrated systems or comprehensive energy management solutions, the ETP will continue to work on strategic single-technology measures. Indeed, the statewide ET program has a long track record of interventions in the commercial sector with projects that include work on advanced lighting controls, finned cooking pots that save gas in commercial kitchens, high bay LED lighting luminaires, retail display lighting, advanced rooftop units that provide heating or cooling, enhanced ventilation controls, laundry systems that utilize ozone gas to reduce water and associated heating energy needs, and LED lighting in refrigerated display cases.

Because balancing advanced, integrated solutions with traditional, standalone measures is a critical strategy for reaching the largest possible swath of commercial customers, the ETP has made this dual approach a major long-term priority. To successfully execute this dual approach, ETP will work upstream with product developers to integrate energy-saving attributes in the product design phase, motivate technology developers to build integrated solutions, and build on existing partnerships with the EPIC and PIER programs.

Finally, AB 802, passed in 2015, seeks to significantly increase building efficiency in this sector. The ETP will continue to evaluate products, hold demonstrations, identify barriers, and generate data that supports these mandates while delivering positive results for customers.

4. Codes & Standards

The Statewide Codes and Standards (C&S) Program saves energy on behalf of ratepayers by influencing standards and code-setting bodies, such as the California Energy Commission (CEC) and the Department of Energy (DOE), to strengthen EE regulations by improving compliance with existing C&S, assisting local governments to develop ordinances (reach codes) that exceed statewide minimum requirements. The C&S effort will also draw commercial customers into the code development process in the early stages to advocate for codes and compliance-related matters.

5. Other DSM Program

To assist customers in managing their energy, the program strategies presented in this business plan will be coordinated and integrated with other customer demand-side opportunities, where feasible.

a. Integrated DSM

The integrated Demand-side Management (IDSM) encourages the integration of a full range of DSM options such energy efficiency, advanced metering, low income energy efficiency, distributed generation, and alternate fuel vehicles. SoCalGas will continue identifying, designing, developing, and incubating new program partnering and integration ideas and opportunities with its peer utilities. It will also continue maintaining successful energy and water efficiency offerings that it operates jointly with various municipal utilities. SoCalGas and its implementers will continue maintaining a close working relationship with the program staffs at other utilities, as well as ensuring that all aspects of joint program operations, such as reporting and billing, remain at the highest standard. Having a smooth and positive working relationship with the staffs from the other utilities allows both SoCalGas and the other utilities to build confidence and continue expanding partnering and integration opportunities.

SoCalGas will continue to engage municipal utilities and other IOUs operating in SoCalGas service territories, as well as other public and private agencies that support these municipalities, such as the Southern California Power Procurement Authority (SCPPA). SoCalGas will seek collaboration among SoCalGas program staff, third party implementers and the personnel at the peer utilities to develop comprehensive and integrated approaches to Demand Side Management. SoCalGas staff will continue to facilitate and support all aspects of joint commercial program design, development, launch, and operations, as needed with its external and internal partners. Internally, SoCalGas will continue developing partnership opportunities with other Demand-Side Programs, including the Energy Savings Assistance Program, Solar Thermal Program and Advanced Meter Program, to ensure that customers will receive a comprehensive package of offerings.

b. Demand Response

The commercial sector business plan proposes to leverage emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and energy management technologies to permanently modify customer behavior which will result in reliable energy efficiency savings and serve to support utility demand response activities. Where practicable, these efforts will also partner with electric and

water agencies with AMI technologies to provide a simple, one-touch efficiency and demand response experience.

c. Residential Rate Reform

Not applicable.

d. Integrated Demand Side Resources

[Pending]

e. Alternate Fuel Vehicles

In California, SB 350, codified in Public Utilities Code § 740.12(a)(1), states the following goal: “Advanced clean vehicles and fuels are needed to reduce petroleum use, to meet air quality standards, to improve public health, and to achieve greenhouse gas emissions reduction goals.”⁵ The commercial sector business plan proposes to increase awareness of alternative fuel vehicle options to serve the commercial sector transportation needs to significantly reduce NOx and GHG emissions. Consistent with SB 350’s goals to address barriers to access for low-income customers to zero-emission and near-zero-emission transportation options,⁶ outreach efforts directed at commercial customers within disadvantaged communities will also emphasize the benefits and opportunities for alternate fuel vehicles supporting the commercial sector.

f. Energy Savings Assistance (Multifamily)

[pending]

g. Sourcing

Sourcing for the program intervention strategies will call upon the innovative proposals of the program implementer community and the unique market position of the utility. Specific programs will be designed and delivered in the appropriate market channel by third party implementers. The scope of the request for proposals for programs will be guided by the adopted program strategies represented in this business plan. The third party program implementer community will be called upon to propose specific program designs and delivery approaches as part of the program solicitation process. SoCalGas will collaborate with selected third party implementers to further program design to integrate with other energy efficiency strategies within the portfolio and to increase the likelihood of success.

To maintain current efficiencies and avoid customer confusion and frustration, key customer services, in support of the energy efficiency portfolio, will be maintained by SoCalGas in close coordination with the program implementer. These customer services include: customer representative to promote EE programs and program implementer customer engagement; processing customer rebate payment for downstream programs; project engineering reviews; program inspections; utility website to promote and receive customer requests for participation; and managing customer requests/complaints to SoCalGas.

Consistent with a key principle of the EE rolling portfolio to promote a healthy and vibrant EE ecosystem in California, for both large and small providers, SoCalGas will release a series of competitive

⁵⁵ Public Utilities Code § 740.12(a)(1).

⁶ See SB 350 (Statutes 2015, Chapter 547), at Section 7. See CAL. PUB. UTIL. CODE §25327(d).

solicitations, on annual basis, to allow for continuous opportunities for the EE service provider community and to encourage ongoing innovation within the EE portfolio. SoCalGas plans to launch the first set of program solicitations in 2017 in expectation of Commission approval of the energy efficiency business plan application. The following provides the solicitation plan, including estimated timeline for each program solicitation and implementation, for the sector through 2020:

Program Strategy	Program Tactic	RFP Release Date	Implementation Date
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD

h. EM&V Considerations

The commercial sector contains a wide variety of segments with very unique and diverse ways they use energy. There is a need for more extensive research in each of the different segments and sub-segments within the commercial sector, especially a deeper examination of potential barriers to ZNE adoption.

The commercial customer can benefit greatly from permanent changes in their energy usage. For instance, there are several maintenance and operational changes that can have a great impact in the amount of energy consumed. Estimating the impact of behavioral measures will be paramount to the near and long-term success in achieving the overall goal of the commercial sector.

The following are recommendations to improve the body of knowledge regarding the commercial sector.

Market Research and Process Evaluation:

- Conduct a market study to identify the unique segments within the commercial sector and to examine their unique characteristics and trends within their specific segment or sub-segment.
- Interview commercial customers to identify where program participation process can be simplified.

Load Impact:

- Use normalized metered energy consumption data to determine the overall impact of O&M and behavior measures as an enhanced approach to quantify energy savings. For this approach, energy savings are calculated as the difference between the normalized metered energy consumption for baseline and post-intervention time periods.
- Consistent with AB 793 (§717(3)) requirements, evaluate gas energy savings claims achieved pursuant to the incentives for energy management technologies to determine if the program strategies shall continue or be modified.

Appendix A: Sector Metrics

Energy Efficiency Business Plans: Sector Metric Table - Commercial Sector									
Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10 years)
Varied and unique segments with specific needs make it difficult to offer standard program that fits the needs of all customers.	New commercial buildings will realize the highest natural gas efficiency levels to support a pathway to zero net energy by 2030 for all new and a substantial proportion of existing buildings.	1. Increase adoption of EE solutions by commercial customers with untapped EE potential.	Partnering Intelligent Outreach Small Business Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing Emerging Technologies	Achieve greater levels of EE savings from all commercial segments including leased properties and HVAC measures.	2015 Participation Levels.	Program tracking data.	Increase EE savings from targeted customer group by 5% over 2015 levels by Year 3.	Increase EE savings from targeted customer group by 15% over 2015 levels by Year 7.	Increase EE savings from targeted customer group by 25% over 2015 levels by Year 10.
The commercial sector is trending towards more leased properties creating a	Innovative technologies, enhanced building design, and operation practices (HVAC) will	2. Increased EE levels in EE in commercial leased properties.	Partnering Intelligent Outreach Small Business Outreach Strategic Energy	Increase EE levels in commercial leased properties.	2015 Participation Levels.	Program tracking data.	Increase EE savings from leased properties by 5% over 2015 levels by Year 3.	Increase EE savings from lease properties by 15% over 2015 levels by Year 7.	Increase EE savings from lease properties by 25% over 2015 levels by Year 10.

Energy Efficiency Business Plans: Sector Metric Table - Commercial Sector

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10 years)
larger split incentive barrier between owners and tenants.	dramatically grow in use in the coming years through a combination of comprehensive whole building programs, technology development, market pull, professional education, and targeted financing and incentives.		Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing						
There is builder confusion on how to achieve ZNE in new construction and retrofitting of commercial buildings.		3. Increase number of ZNE-ready buildings across most commercial segments through increased gas energy efficiency.	Partnering Intelligent Outreach Small Commercial Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing	Increase amount of ZNE-ready commercial building stock across most customer segments.	2015 commercial building stock levels.	Program tracking data.	Increase number of ZNE-ready buildings in most segments by 5% of 2015 levels by Year 3.	Increase the number of ZNE-ready building in most segments by 15% of 2015 levels by Year 7.	Increase number of ZNE-ready building in most segments by 25% of 2015 levels by Year 10.
Improper HVAC replacement		4. Increase the number of properly	Partnering Intelligent Outreach	Achieve greater levels of	2015 Participation Levels.	Program tracking data.	Increase number of properly	Increase number of properly	Increase number of properly

Energy Efficiency Business Plans: Sector Metric Table - Commercial Sector

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10 years)
and maintenance of equipment limits the potential for significant energy savings.		installed and maintained HVAC systems.	Small Commercial Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing	HVAC-related natural gas EE savings.			install and maintained HVAC systems by 5% over 2015 levels by Year 3.	install and maintained HVAC systems by 15% over 2015 levels by Year 7.	install and maintained HVAC systems by 25% over 2015 levels by Year 10.



Appendix B: Applicable Legislation and Regulatory Directives

Appendix B: Applicable Legislation		Program Intervention Strategies
SB 350		
	§25310(c)(5) The energy efficiency savings and demand reduction reported for the purposes of achieving the targets established pursuant to paragraph (1) shall be measured taking into consideration the overall reduction in normalized metered electricity and natural gas consumption where these measurement techniques are feasible and cost effective.	P4P, SEM, Data Analytics
	<p>§25310(d) Allowable EE programs [only applicable programs listed]</p> <ul style="list-style-type: none"> o Appliance and building energy efficiency standards developed and adopted pursuant to Section 25402. o Programs of electrical or gas corporations, or community choice aggregators, that provide financial incentives, rebates, technical assistance, and support to their customers to increase energy efficiency, authorized by the Public Utilities Commission. o Programs of electrical or gas corporations, local publicly owned electric utilities, or community choice aggregators, that achieve energy efficiency savings through operational, behavioral, and retrocommissioning activities. 	All
	<p>§25943(a)(2) The comprehensive program may include, but need not be limited to, a broad range of energy assessments, building benchmarking, energy rating, cost-effective energy efficiency improvements, public and private sector energy efficiency financing options, public outreach and education efforts, and green workforce training.</p> <p>**“Energy assessment” means a determination of an energy user’s energy consumption level, relative efficiency compared to other users, and opportunities to achieve greater efficiency or improve energy resource utilization. **</p>	SEM, Data Analytics
	§25943(a)(3) The CEC shall adopt, implement, and enforce a responsible contractor policy for use across all ratepayer-funded energy efficiency programs that involve installation or maintenance, or both, by building contractors to ensure that retrofits meet high-quality performance standards and reduce energy savings lost or foregone due to poor-quality workmanship.	All offerings supporting installation and maintenance
	§25943(d)(5) Determine, for nonresidential structures, the availability of an appropriate cost-effective energy efficiency assessment system and whether there are a sufficient number of certified raters or auditors available to meet the program requirements.	
	§399.4 (d) In updating its policies, the commission shall, at a minimum, do all of the following:	
	(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.	Midstream Equipment, Intelligent Outreach, SEM, P4P

Appendix B: Applicable Legislation		Program Intervention Strategies
(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.		SEM, P4P
(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.		SEM, P4P
(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results.		SEM, P4P, Deemed, Calculated
AB 793		
§717(3)(b) "Energy Management Technology" may include a product, service, or software that allows a customer to better understand and manage electricity or gas use in the customer's home or place of business.		Deemed Incentives, Equipment Midstream
§717(a)(1) Develop a plan by Jan 1, 2017 a program that provides incentives to acquire energy management technology		
§717(a)(2) Develop a plan by September 30, 2016, to educate residential customers and small and medium business customers about the incentive program.		
§717(3) Annually report to the commission on actual customer savings resulting from the incentive program.		Intelligent Outreach
§717(3) The commission shall evaluate all electrical or gas corporation energy savings claims achieved pursuant to the incentive program in a manner consistent with commission-adopted evaluation protocols and determine if the program shall continue or be modified.		EM&V Requirement
AB 758		
Existing Buildings Energy Efficiency Action Plan		
1.2 - Statewide Nonresidential Benchmarking Establish a statewide energy benchmarking program with eventual public disclosure for commercial, public, and multifamily buildings above 50,000 sf gross floor area.		
1.2.1 - Update Time-of-Transaction (AB 1103) Regulations 1. Streamline access to whole-building energy use data for building owners. 2. Implement an aggregation threshold that will enable simple access to useful, actionable data for building owners, while respecting tenant privacy. 3. Work with utilities to map building addresses to meters.		
1.2.4 - Implement Statewide Program 1. Monitor and facilitate compliance with the benchmarking and disclosure regulations. 2. Establish clear metrics to evaluate effectiveness.		

Appendix B: Applicable Legislation	Program Intervention Strategies
<p>1.5.1 - Improve Clarity and Ease of Use Develop approaches to simplify implementation of Building Efficiency Standards (BES) for existing buildings by unifying definitions with industry practice, by clarifying code requirements, and through the use of expert systems or other navigation tools.</p>	
<p>1.5.3 - Training and Communication Enhance communication, education, and interactions with local governments to ease compliance with and enforcement of the standards. Develop effective consumer communication materials to market nonenergy benefits of compliance.</p>	
<p>1.6.3 - Advocacy and Technical Support Support enhanced federal standards and participate in proceedings of the federal government and neighboring countries (Mexico, Canada).</p>	
<p>2.2.1 - Enhanced Program Design and ME&O: Transition to more multifaceted, incremental, and performance-oriented efficiency programs.</p> <ol style="list-style-type: none"> 1. Incorporate all end-use energy sources, including water, plug loads, pools, irrigation, and exterior uses, into programs. 2. Incorporate trigger points to help reach consumers at key transaction points. 3. Establish behavior and operations as central elements impacting building energy consumption by incorporating them into programs, tracking, and evaluating. 4. Use ME&O to create a path that can connect consumers across programs and bundle actions based on their needs. 5. Measure program performance by percentage of eligible participating customers. 	
<p>2.2.2 - Expand Behavior Programs Leverage current and expected innovations made possible with access to AMI data; plan and implement behavior programs with expanded scope and market reach.</p>	
<p>2.2.3 - Targeted Programs: Support a range of targeted approaches to energy and water efficiency for property owners and occupants based on data-driven market segmentation and filtering. Use data to develop and leverage consumer profiles and use those profiles to meet consumers where they are and motivate them to take the next action.</p>	
<p>2.2.4 - Building/Portfolio Cohorts: Build on existing IOU pilots for small and medium-size commercial buildings that use a property owner cohort model to encourage engagement, awareness, value, and implementation of improvements to buildings including capital, operational, and behavior; consider designating cohorts based on building types, end use, and/or project types. Evaluate effectiveness of working with corporations to address energy use for a</p>	SEM

Appendix B: Applicable Legislation		Program Intervention Strategies
	portfolio of buildings. Develop asset-based classes for investor-ready projects.	
	<p>3.1.1 - Sustainable and Effective Program Delivery Enhance program portfolios to reduce transaction costs and dramatically increase effects in hard-to-reach sectors.</p> <ol style="list-style-type: none"> 1. Streamline program requirements and operational procedures. Expand statewide programs with uniform designs. 2. Improve and expand direct-install programs for hard-to-reach populations. 3. Develop and implement new program designs for small and medium commercial and multifamily buildings. 4. Implement rolling program portfolios to solidify long-term funding commitments that align with business investment decisions. (Align with Strategy 1.9.) 	
	<p>3.1.2 - Industry Partners Program Develop partner programs with trade organizations and industry agents to address key market barriers and facilitate industry innovations (by sector and/or end-use).</p> <ol style="list-style-type: none"> 1. Provide broad access to market research program evaluation findings, understand market dynamics, share best practices, and foster industry engagement in determining effective efficiency strategies and approaches (for example, WHPA). 	
	<p>3.4.2 - Develop and/or Enhance ZNE Retrofit Design Tool Kits Identify building/business types well-suited for ZNE retrofits but where current ZNE guidance is scarce. Provide design and financing guidance to ease adoption of ZNE retrofit strategies.</p>	
	<p>3.4.3 - Provide Incentives and Other Financing Mechanisms Make financing widely available for ZNE retrofits.</p>	
	<p>4.1.2 - Energy and Water Cost Savings Develop and compile information on building life-cycle and/or building occupant tenure cost reductions for energy and water efficiency measures. Develop separate cost savings estimates as needed for each unique commercial business category and building type, as well as unique residential dwelling type. Incorporate regional (for example, climate) differences in expected cost savings information, when appropriate.</p>	
	<p>5.2.3 - Split Incentives Assess and encourage new cost recovery mechanisms such as surcharge on tenant meters or “green leases” to surmount “split incentive” dilemma.</p>	
	<p>5.4.1 - Streamlined Timing – (Integrated and Streamlined Delivery of Efficiency Solutions, Finance, and Utility Incentives) Identify and deploy solutions for prompt processing of loans and incentives to avoid or minimize cash flow gap between loan funding and any post-installation rebate payment.</p>	

Appendix B: Applicable Legislation		Program Intervention Strategies
5.7.1 - Balanced Assistance Options Work with stakeholders to assess optimal balance of assistance options across financing, on-bill repayment tied to meter, and grants or direct installation to maximize water and energy efficiency levels, using ratepayer, occupant, or other funds.		
AB 802		
"§381.2(b) Recognizing the already underway 2015 commission work to adopt efficiency potential and goals, the Energy Commission work on its 2015 energy demand forecast, and the need to determine how to incorporate meter-based performance into determinations of goals, portfolio cost-effectiveness, and authorized budgets, the commission, in a separate or existing proceeding, shall, by September 1, 2016, authorize electrical corporations or gas corporations to provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings. Those programs shall include energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations, as well as operational, behavioral, and retrocommissioning activities reasonably expected to produce multiyear savings. Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission. The commission may adjust the energy efficiency goals or targets of an electrical corporation and gas corporation to reflect this change in savings estimation consistent with this subdivision and subdivision (d)." [Emphasis, added]		SEM, P4P, Intelligent Outreach
"(c) Effective January 1, 2016, electrical corporations and gas corporations are authorized to implement the provisions of subdivision (b) for high opportunity projects or programs. The commission shall provide expedited authorization of high opportunity projects and programs to apply the savings baseline provisions in subdivision (b). (d) In furtherance of subdivision (b), the commission, in consultation with the Energy Commission, shall consider all of the following: (1) The results of any interagency baseline assessment. (2) Any available results from investor-owned utility baseline pilot studies ordered in D.14-10-046. (3) Information necessary to ensure consistency with the energy forecast		SEM, P4P

Appendix B: Applicable Legislation		Program Intervention Strategies
	<p>and planning functions of the Energy Commission and the Independent System Operator.</p> <p>(e) The commission may direct electrical corporations and gas corporations to make filings that are necessary to ensure coordination with the energy forecast and planning functions of the Energy Commission and the Independent System Operator."</p>	
SB 1414		
	<p>§399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive provides proof of permit closure and certifies that the improvement or installation has complied with any applicable permitting requirements and any specifications or requirements set forth in the California Building Standards Code (Title 24 of the California Code of Regulations), and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.</p>	P4P, SEM, Calculated, Deemed
	<p>"(d) The commission, in a new or existing proceeding, shall review and update its policies governing energy efficiency programs funded by utility customers to facilitate achieving the targets established pursuant to subdivision (c) of Section 25310 of the Public Resources Code. In updating its policies, the commission shall, at a minimum, do all of the following:</p> <p>(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.</p> <p>(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.</p> <p>(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.</p> <p>(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results."</p>	P4P, SEM, Intelligent Outreach, Calculated, Deemed

Appendix B: CPUC Regulatory Directives

Sector-specific CPUC Regulatory Directives	Cite	Response
<p>As the strategic energy management approach leads to capture of additional savings from behavioral, retrocommissioning, and operational activities, as well as identification of bigger opportunities and tracking of projects planned by the customer, we direct the utilities to modify their continuous energy improvement programs or develop new programs to offer a robust strategic energy management program, using a statewide program design. We note in Section 4.9.2 below that strategic energy management appears to be a candidate for statewide implementation and strongly urge the utility program administrators to select this as one of the program areas that falls under this approach.</p>	<p>D.16-08-019, p. 42</p>	<p>See, Program Strategies discussion. The public sector business plan proposes a new Strategic Energy Management program strategy with key design features based on best practices from other SEM program offered in the industry. The proposed program strategy represents a coordinated statewide effort across all IOU program administrators.</p>
<p>In addition, we require the program administrators to pilot the statewide approach with at least four separate programs that are currently considered downstream but which have some statewide elements. Candidate programs would appear to be:</p> <ul style="list-style-type: none"> • Energy Upgrade California Home Upgrade program • Commercial Deemed Incentives • Strategic Energy Management (any sector) • Commercial Energy Advisor <p>As with the upstream and midstream programs, the program administrators, after discussion in the CAEECC, shall propose a lead program administrator and other program details, in their business plans.</p>	<p>D.16-08-019, p. 65</p>	<p>See, Program Delivery discussion. SoCalGas in collaboration with other IOU program administrators have identified a set of downstream programs as candidates for the new statewide approach.</p>
<p>Instead of requiring the large commercial sector to be 100 percent third-party designed and delivered beginning in 2017, we will ask the utility program administrators (and other program</p>	<p>D.16-08-019, p. 71</p>	<p>See, Program Delivery discussion.</p>

Appendix B: CPUC Regulatory Directives

Sector-specific CPUC Regulatory Directives	Cite	Response
<p>administrators, as desired) to present to us in their business plans a proposal for transitioning the majority of their portfolios to be outsourced as described by the CEEIC, with the transition completed by the end of 2020. Basically, all program design and delivery would be presumed to be conducted by third parties, unless the utility specifically made a case for why the program activity must be conducted by utility personnel.</p>		
<p>Program administrators shall ensure a smooth transition between existing energy efficiency program activities and the changes outlined in this decision, to be proposed in the business plans due January 15, 2017, minimizing program disruptions and avoiding any funding hiatus for ongoing efforts or partnerships.</p>	<p>D.16-08-019, OPN 14, p. 112</p>	<p>See, Program Delivery discussion. During the transition to a new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market.</p>
<p>As discussed above, we will require all of the upstream and midstream program delivery types to be administered according to the statewide definition adopted in this decision. These sub-programs include, but are not necessarily limited to:</p> <p>Residential</p> <ul style="list-style-type: none"> • Plug Load and Appliances Midstream • Residential Heating Ventilation and Air Conditioning (HVAC) <p>- Upstream/Midstream</p> <ul style="list-style-type: none"> • Residential New Construction <p>Commercial</p> <ul style="list-style-type: none"> • Commercial HVAC – upstream and midstream • Savings by Design [Emphasis added] <p>Lighting (even if moved to sectoral program area)</p> <ul style="list-style-type: none"> • Primary Lighting • Lighting Innovation • Lighting Market Transformation <p>Financing</p>	<p>D.16-08-019, pp. 62-64</p>	<p>See, Program Delivery discussion. SoCalGas will work with other IOUs to create a single statewide program, consistent with the CPUC’s statewide definition, for the following commercial program offerings:</p> <ul style="list-style-type: none"> • Commercial HVAC – upstream and midstream • Savings by Design

Appendix B: CPUC Regulatory Directives

Sector-specific CPUC Regulatory Directives	Cite	Response
<ul style="list-style-type: none"> • New Finance Offerings Codes and Standards <ul style="list-style-type: none"> • Building Codes Advocacy • Appliance Standards Advocacy Emerging Technologies <ul style="list-style-type: none"> • Technology Development Support • Technology Assessments • Technology Introduction Support Workforce, Education, and Training Programs <ul style="list-style-type: none"> • Connections Government Partnerships <ul style="list-style-type: none"> • California Community Colleges • UC/CSU • State of California • Department of Corrections and Rehabilitation Marketing, Education, and Outreach Energy Upgrade California campaign [not part of the SW requirement]		
8. All upstream and midstream programs, including but not necessarily limited to the following programs and/or subprograms from the existing portfolio, plus new programs proposed in business plans that are market transformation, upstream, or midstream, shall be delivered statewide according to the definition in Ordering Paragraph 5 above: Residential: Plug Load and Appliance Midstream, Heating Ventilation and Air Conditioning (HVAC) Upstream/Midstream, New Construction; Commercial: HVAC Upstream/Midstream, Savings by Design; [Emphasis added] Lighting: Primary Lighting, Lighting Innovation, Market Transformation; Financing: New Finance Offerings; Codes and Standards: Building Codes Advocacy, Appliance Standards Advocacy; Emerging Technologies: Technology Development Support, Technology Assessments, Technology Introduction Support; Workforce, Education, and Training: Connections; Government Partnerships:	D.16-08-019, OPN 8, pp. 110-111	See, Program Delivery discussion. SoCalGas will work with other IOUs to create a single statewide program, consistent with the CPUC’s statewide definition, for the following commercial program offerings: <ul style="list-style-type: none"> • Commercial HVAC – upstream and midstream • Savings by Design

Appendix B: CPUC Regulatory Directives		
Sector-specific CPUC Regulatory Directives	Cite	Response
California Community Colleges, University of California/California State University, State of California, Department of Corrections and Rehabilitation.		

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Appendix C: EM&V Studies

CPUC EM&V Studies:

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2. CALMAC Study, "Baseline Market Effects Study of Investor Owned Utility Residential and Small Commercial HVAC Quality Installation and Quality Improvement Programs in California (Work Order 054)"; Published January 14, 2015 (CALMAC Study ID CPU0102.01)
http://calmac.org/publications/CPUC_HVAC_Baseline_Market_Study_Final_Report.pdf
3. CALMAC Study, "HVAC Impact Evaluation Draft Report WO32 HVAC" Volume 1: Report (CPU100.01); Published August 27, 2014
http://calmac.org/publications/FINAL_HVAC_Impact_Evaluation_WO32_Report_28Jan2015_Volume1_Report.pdf
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<http://www.energydataweb.com/cpucFiles/pdaDocs/1456/HVAC1ImpactReportDraft%20Final%20030116.pdf>
5. CALMAC Study, Inc., "Non-Residential Process Evaluation Study: Main Report", Heschong Mahone Group, prepared for the Southern California Gas Company. March 2012. (CALMAC Study ID SCG0213.01.)
6. CALMAC Study, Inc., "2013 Custom Impact Evaluation: Industrial, Agricultural, and Large Commercial", Itron, Inc., prepared for the California Public Utilities Commission. July 2015. (CALMAC Study ID CPU0107.01.)
7. Navigant Consulting, Inc. Energy Efficiency Potential and Goals Study for 2015 and Beyond, prepared for the California Public Utilities Commission. September 25, 2015.
8. Add SBD and MASI

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<http://aceee.org/sites/default/files/publications/researchreports/a052.pdf>
4. Energy Codes for Ultra-Low-Energy Buildings: A Critical Pathway to Zero Net Energy Buildings Jennifer Thorne Amann, December 2014 Report Number A403
<http://aceee.org/sites/default/files/publications/researchreports/a1403.pdf>
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2006

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7. Overcoming Market Barriers and Using Market Forces to Advance Energy Efficiency ACEEE Executive Summary, March 2013
<https://sps.socalgas.com/wg/wc/scg/Commercial%20Business%20Plan/6.%20Journal%20Articles/Overcoming%20Market%20Barriers.pdf>
8. Market Segmentation and Energy Efficiency Design prepared by Steven J. Moss, M. Cubed with Assistance from Kerry Fleisher, San Francisco Power CIEE Behavior and Energy Program Edward Vine, Program Manager, California Institute for Energy and Environment, Oakland CA November, 2008
http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/pdfs/market_seg.pdf
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10. Financing for Multi-Tenant Building Efficiency: Why This Market is Underserved and What Can Be Done to Reach It, Casey J. Bell, Stephanie Sienkowski, and Sameer Kwatra, August 2013 Report Number E13E
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13. NBI California watchlist – number of zne, near zne projects http://newbuildings.org/wp-content/uploads/2016/02/CA-ZNE_Watchlist_Dec2015.pdf
14. Rocky Mountain Institute http://www.rmi.org/tools_and_resources#split_incentives
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<http://www.energydataweb.com/cpucFiles/pdaDocs/1284/DeemedHVACMeasures.pdf>
16. Approaching Commercial Sector Market Transformation By Market Segment: Opportunities in Existing Offices Jennifer Thorne, August 2000 Report Number A004
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Appendix D: External Stakeholder Observations

Appendix D: External Stakeholder Observations				
Reference	Recommendation	Date	Source	Response
0016	Suggestion to dive deeper into the data and get to the next level of understanding of the customer, including SMB, and other breakdowns (e.g., owner vs. renter) in order to finalize Overview of Commercial Market and Gap Analysis (Stage 1 assessment)	2/22/16	2/22 Com SC Mtg	See, Intelligent Outreach. Through new data analytic techniques, AMI data can provide greater, and continuous, customer segmentation to identify opportunities for EE retrofits and permanent energy behavior modifications.
0044	Suggestion to follow up with neighborhood association and SMB associations.	2/22/16	2/22 Com SC Mtg	See, Industry Partnering. A consistent approach to leveraging existing resources of industry groups to promote EE to targeted customer groups.
0089	Recommendation for PA Commercial Sector teams to pull lessons learned from NEEAs "Analysis of Commercial Real Estate Market Partners Program Savings Persistence"	3/1/16	CM0213	See SEM program strategies. Offer SEM to larger commercial customers including a cohort model. SoCalGas is currently testing a competition-based model for commercial customers within its South Bay Partnership.

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0103	<p>National Account (or International Account) customers comprise customers with facilities and operations across multiple jurisdictions, stateliness, and international borders. By the very nature of these multi-site operations, many customers work around a limited number of prototype stores designs. Additionally, given the volume of operations that interact with energy services, such customers approach to energy management vary from those with dedicated and highly efficient energy management divisions to highly fragmented approaches to energy and/or outsources services for energy management. Some customers in this group may have high visibility goals to reduce energy use as part of sustainability or business efficiency plans. Because such customers are often considered key customers to utilities, they may have dedicated account representatives at utilities and such relationships may span many years. Finally, because such customers may plan energy projects over several years, they are often attributed as free-riders – but this negates the critical role that they may have in driving overall market transformation and the test/roll-out of new technologies that may benefit broader markets. Finally, simply ascribing all such operations as free-riders severely limits the achievable savings in the market as such customers comprise significant portions of load.</p> <p>1) Consider the constraints on planning horizons: One option that we have seen in another state involves the utility working with individual chain customers to set long-term energy efficiency goals together and to pre-ascribe budget to the achievement of these goals. This is most akin to the concept of Strategic Energy Management and it alleviates the calendar year concerns of many customers. It also enables utilities to begin working with those customers from an early time to help them set their plans, provide clearer guidance or support on individual and multi- site projects, and in documenting influence on such</p>	3/30/16	CM0223	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	<p>projects. Rather than simply punishing companies who want to set long-term energy reduction goals, this enables them to achieve their plans and do so in partnership with their utilities.</p> <p>2) Consider the resource constraints: There may be a good argument for a statewide approach to national accounts that would help limit the number of individual program touchpoints that such customers find hard to manage. Additionally, rather than expect such customers to work through multiple different programs, such an approach would provide them the sort of single-point of contact that they have asked for.</p> <p>3) Tackle the free-ridership issues up front: A direct working group with the ED that would serve to lay guidelines for what constitutes free-ridership among national accounts may help mitigate both lost projects/savings, wasted time/effort/cost, and damaged customer relationships.</p> <p>4) Support utility account reps with third-party expertise: While we have seen only one example of a dedicated national account energy efficiency program (at Focus on Energy, Wisconsin), we believe dedicated national account programs do not tackle the variety of customers within the national accounts world and tend to enable rebate chasing rather than strategic energy management. A fuller understanding of the subsegments within national accounts would help define whether a dedicated program would suit California and/or what supplementary programs or program support utilities could benefit from.</p> <p>5) Continue the work started by the Edison Electric Institute to best lay a long-term path for working with key accounts either on an individual SEM basis or as defined subsegments within other programs. The bi-annual EEI National Accounts workshop has tackled the support of national accounts for over 25 years and started the working group that led to the Navigant study.</p>			
0143	Would like to see measure/end-use related challenge statements in BP (e.g., HVAC, not just sector challenges) whether it's own statement or	4/29/16	4/15/16 Commercial SC	See, Problem Statements. The Business Planning

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	articulated under a broader umbrella statement		Mtg	process identified a unique problem statement associated with HVAC in the commercial sector.
0144	Request made of MCE to show problem statements that its strategies are designed to address	4/29/16	4/15/16 Commercial SC Mtg	Not applicable.
0145	Problem statements don't address the difference between managing programs for comprehensive all at once services versus sequence/path to comprehensiveness over time	4/29/16	4/15/16 Commercial SC Mtg	See, Commercial Sector Objectives. The Business Plan support the customer's choice of "all at once" or a serial path to comprehensive EE. Program strategies will support both customer pathways.
0146	How do you get proof for the value proposition for small HVAC systems...a foundational protocol is required	4/29/16	4/15/16 Commercial SC Mtg	The Business Plan relies upon CPUC-adopted EE values to assess value to the ratepayer for a set of programs and measures.
0148	Consider changing energy audits to a broader "value" audit that might include things like noise, etc. Therefore while the traditional audit would be used for CPUC related energy savings calculations, the other non energy benefits identified on the audit would be used for selling the project to the customer	4/29/16	4/15/16 Commercial SC Mtg	See, Intelligent Outreach. The strategy will focus on energy-related audits and, with a cost sharing model with a water agency partner, water-related audits, consistent with current CPUC policies.
0149	Will code readiness be addressed more fully in each sector chapter	4/29/16	4/15/16 Commercial SC Mtg	
0154	I've read through two of the four presentations already. So far I've noticed that PAs are using different boxes (segmenting sector by different factors—e.g., 5 market segments, each broken into small, medium, and large versus by end uses, etc.) Not clear whether that is OK or not. Should there be a common framework for segmenting the	5/12/16	4/25/16 Commercial Follow Up Webinar	The Business Plan proposes to offer programs through NAISC segments and sub-segments and customer sizes.

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	sector?			
0155	In the two presentation/narratives I read, I didn't always see consistent representation of barriers, observations, solutions, and metrics nor consistent linkages between them. Often 3 of 4 were shown in a given presentation, but not all four. PAs should do a more consistent job of that as they refine the documents. Please show how you get to your metrics tie into the strategies—do they really measure that strategy. It also wasn't always clear from the two documents how the strategies actually addressed the problem statement, nor did they articulate what's new, what's old and justification for keeping the old programs going. Examples given from both PG&E and BayREN documents referring to specific tables showing how linkages hadn't been consistently made.	5/12/16	4/25/16 Commercial Follow Up Webinar	See, Program Intervention Strategies & Delivery for a discussion on how market barriers, program intervention strategies and metrics are related.
0156	Stage 1 analyses were helpful, but it appeared that everyone was using Navigant Potential study's "market" potential values. I think you should be considering economic potential as well, given that "market" potential presupposes current program strategies. Economic potential isn't biased by past EE program practices. Not expecting miracles on this, but think at least footnotes that point out the much large economic potential should be included.	5/12/16	4/25/16 Commercial Follow Up Webinar	See, Customer Landscape. SoCalGas proposes to achieve market potential and a portion of economic potential for many of the customer segments.
0158	Need to work on simplifying offerings, especially from the customer perspective. Consistency across the market sector.	5/12/16	4/25/16 Commercial Follow Up Webinar	See, Program Intervention Strategies & Delivery. Primary objective is to offer a simplified program experience for all customers.
0162	PAs asked to consider background (in Ref Doc CM0254) for crafting EE investment/ improvement strategies for commercial buildings. This file (CM0254) COMBINES presentations by 2 organizations: 1. Institute for Market Transformation – including interviews with financial institutions and those familiar with	5/12/16	CM0253	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	commercial mortgage industry and 2. TIAA – a major pension/investment organization that invests in commercial real estate and has taken a leading role in selecting or spurring sustainable buildings.			
0164	There is a lot of missed opportunity in class A and B office space, in particular...with more resources going toward education and programs that are attractive to tenants and landlords, we should be able to break through the barrier.	6/1/16	3/30/16 CC Meeting	See, Intelligent Outreach. Data analytics will identify EE opportunities across class A, B and C office space.
0187	Key segment metrics will continue to implicitly push implementers towards low hanging fruit. Should be considered from both a technological and geographic perspective. Use the Societal Cost Test or the California Energy Commission's "Savings to Investment" (SIR) ratio as incremental steps in the right direction while exploring more robust cost-effectiveness test that internalizes while not being limited to the following: GHG reductions, Human health and safety gains, reduced environmental impact and localized economic multipliers.	6/1/16	CM0277	The Business Plan relies on the current CPUC EE Policies to develop a proposed program portfolio approach.
0188	Rapidly changing incentive levels for a given measure are a big problem. Recommend ensuring that incentives are stabilized at the PA and PUC level to ensure market stability for decision makers.	6/1/16	CM0277	Changes in incentive levels can activate and deactivate customer interest in an EE solution. The rolling portfolio approach allows programs to identify and set the appropriate incentive level based on customer reaction.
0189	Lack of funding and payback are significant barriers in rural settings. Ensure that the solutions that are devised are not solely for urban affluent areas but that the solutions have broader applicability to the state	6/2/16	CM0277	See, Small Business Outreach. The strategy will focus on commercial customers within rural communities to identify program intervention strategies to overcome unique market barriers

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
				facing rural commercial customers.
0190	PAs must allow innovative non-resource projects to be institutionalized and programmatically measured separate and apart from resource-based kWh savings projects.	6/2/16	CM0277	The Business Plan proposes a balanced approach among resource programs and those program offerings that enable resource programs (i.e., non-resource).
0191	PA goals as defined in the Portfolio Vision is narrowly defined and does not represent the localizing of energy efficiency opportunities and resources that make partners and implementers a value add to the larger community. A series of proposed roles for local government is stipulated (see document CM0277 for complete detail)	6/2/16	CM0277	See, Vision, Goals, Objectives and Sector Strategies. Vision is based on the customer EE needs not how programs are offered. Partnering with a variety of groups to leverage their natural market actor role (e.g., local governments providing code compliance) is a key strategy.

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0225	<p>Guidance for SCG Stage 2 Presentation/Document On page 5 & 7 try for greater insight and description of the “misc.” accounts into clumps that either can be treated or excluded entirely. On page 9&10, make sure data presented is clear and adequately explained--see CLN-2 in [CM0293] Re “Split Owner-Tenant Incentive” Problem on page 16, the statement at top of page says “program design and policy require benefits go to the entity that is officially recorded as the meter owner. Any/all PAs who see this as problem should recommend change in CPUC policy or program design, as appropriate. See CLN-5 of [CM0293] for questions and recommendations about Direct Install and Green Leases on SCG document page 16-17. CLN-6 re page 18 on Commercial ZNE. Not clear what relevance is for gas and no reflection of considerable progress that has been made on commercial ZNE. Be clear in explaining the gas end use, GHG impacts, and economic factors or value proposition for gas utility involvement in ZNE. Discuss role of collaboration with electric utilities.</p> <p>Observations on Problem #4 HVAC page 21</p> <ul style="list-style-type: none"> • Unclear magnitude of barrier issues between installer technician quality and selection of right/ EE equipment at turnover. • Then the solutions discussion seems to focus on pulling permits and getting enforcement. • Ends with discussion of new technologies and engagement with “PIER” for gas technology and whole building research. This would seem more focused on new construction? <p>Recommended Action</p> <ul style="list-style-type: none"> • Please make sure that logic holds together between problems and solution strategies identified. • Please address what segments or portion of market each strategy pertains to. 	6/8/16	CM0293	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0226	<p>THIS COMMENT APPLIES TO ALL PROGRAM ADMINISTRATORS. Observations</p> <ul style="list-style-type: none"> • “Incremental market potential” (by end use) comes from the Navigant 2015 study. <p>Recommended Action</p> <ul style="list-style-type: none"> • Need to update potential values, perhaps starting with the Navigant Technical Analysis and does not consider implications for managers, tenants, design team, owner, ...”is appended to the April 2016 CPUC staff white paper on Existing Conditions Baseline. Alternatively, could look into merits of using the ECONOMIC potential identified in the Navigant 2015 study. (see CLN-3 in [CM0293]) 	6/8/16	CM0293	

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Appendix E: Glossary of Terms & Definitions

Appendix E: Common Terms & Definitions	
Program Intervention	A deliberate effort by utilities to intervene in the market to reduce market barriers and thereby change the level of investment in (or practice of) energy efficiency. An intervention's success in reducing market barriers, therefore, hinges on whether it leads to or causes a net beneficial outcome from a societal perspective.
Program	A set of tactics offered to the customer as part of a program intervention.
Tactics	An action embodied within a program to carry out a program intervention strategy.
Sector Metric (aka, market effect metric)	Indicator of progress towards achieving desired market effect(s). For the purpose of developing EE business plans, sector metrics only reflect the PA program intervention strategies, and rely on readily available data to allow for active monitoring by PA of progress towards achieving desired market effect.
Program Intervention Metric	Indicator of progress towards achieving a desired market effect by a program intervention through monitoring of program strategy output activities. A program's theory explains why the desired market effects are expected to result from the program's output and activities.
Baseline	The minimum or starting point used to compare the metric progress to achieving stated target.
Sector Target	The quantitative goal towards which a sector metric tracks progress. Sector metrics and targets can be used with both sector-level outputs and sector-level outcomes, whichever is more useful to the PA.
Program Target	The numeric value assigned to the program metric. The numeric value assigned to the program metric. The quantitative goal towards which a program metric tracks progress. Program metrics and targets can be used with both program outputs and program outcomes, whichever is more useful to the PA.
Desired market effect	A market effect is a change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).
Problem Statement	A summary of market barriers identified within a customer sector.
Market Barriers	Those market characteristics that inhibit the natural market adoption of energy efficiency without need for market intervention. (see, set of market barrier)
Short-term	1-3 years
Mid-term	4-7 years
Long-term	8-10+ years
Market Channel	The point of entrance in the marketplace by a program. (downstream, midstream, upstream)

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Industrial Sector Chapter

Draft

October 18, 2016



A  Sempra Energy utility

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A. Executive Summary

Southern California Gas Company’s industrial customer sector represents nearly 52% of the natural gas consumed by all customers. The industrial sector usage is dominated by a few, very large customers that consume nearly 90% of the natural gas within the industrial sector. There are nine distinct customer segments that make up the industrial sector. Customer sizes can vary greatly within these unique and numerous segments creating a very diffused energy efficiency market. There is a significant amount of untapped energy savings associated with changes in customer operations and practices. Ultimately, industrial customers fall into two distinct groups: customers that rely on natural gas as part of their industrial processes and those customers who have an energy consumption profile similar to that of a commercial or residential customer.

The industrial business plan includes a combination of proven and newer program strategies coupled with inventive approaches to efficiently identify customers with the greatest energy efficiency opportunities using data analytic advancements enabled by SoCalGas’ newly implemented Advanced Metering (AMI). Using data analytics and traditional outreach approaches, SoCalGas will offer an integrated set of program strategies that meet the customer’s unique energy efficiency needs. The industrial sector offers an abundance of energy savings opportunities for the customer including operational changes in production processes and improvements to operations and maintenance (O&M) practices. Specific program strategies will be offered to the customer to permanently capture these energy savings. To encourage greater adoption of energy efficiency among small business owners, SoCalGas will offer a simple, low cost suite of strategies that are tailored for smaller operations.

1. Summary Tables

Table A.1: Sector Forecast - Industrial

Program Impacts	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
MWh	TBD										
MW	TBD										
Therms	TBD										

Emissions

CO2	TBD										
PM-10	TBD										
NOx	TBD										

Cost-effectiveness TRC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

Cost-effectiveness PAC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

2. Proposal Compared To Prior Cycles

In past program cycles, program portfolios were offered based on specific programs and/or technologies. The sectorial business plan approach is strategy-based with a focus on customer needs and expectations, within like customer groups, proactively offered in a deliberate and efficient manner in order to significantly increase the adoption of customer energy efficiency solutions among all customer types within a sector. Taking advantage of new AMI technology, customer energy usage habits can now be examined, through efficient data analytics, to identify how customers can introduce energy efficiency into their business operations. No longer are energy efficiency programs passively offered when customers decide to participate. Now customers are actively encouraged to modify energy behaviors and to invest in the right EE upgrades at the right time, based on a coordinated set of program offerings, to improve the overall efficiency of their business operations.

In addition to proven program strategies, SoCalGas will incorporate new program strategies and corresponding program tactics to arrive at a complete EE solution set for the industrial customer. The proven and new program strategies are further detailed in the Program Intervention Strategies section. The new program approaches and the proposed implementation timeframe are summarized below:

Program Strategy	Program Tactic	Implementation Timing*
Partnering	Utility Partnering	Near-term, mid-term
	Industry Partnering	Near-term, mid-term
Intelligent Outreach	Data Analytics	Near, mid-term
	Virtual Engagement	Near, mid-term
	Energy Management Technologies	Near, mid-term
	Sharing EE Best Practices	Near-term
	Small Industrial Outreach	Near-term
Strategic Energy Management		Near-term
Customer Incentives	Pay-for-Performance	Near-term
	Bundled Measures	Near-term
Direct Install	Direct Install	Near-term
	Comprehensive Direct Install	Near-term

*Note: Near-term = 1-3 years; mid-term = 4-7 years; long-term = 8+ years.

3. Response To Sector Challenges

There are several challenges facing the industrial sector based on an examination of past customer participation habits, future energy efficiency potential, recent evaluation studies, and current and expected industry trends. The industrial sector has a unique set of market barriers that inhibit the customer from achieving greater levels of energy efficiency. SoCalGas has distilled these barriers into the following sector problem statements:

1. Low adoption of energy efficiency solutions by micro/small industrial segment.
2. Complex and time-consuming process to pursue energy efficiency solutions.
3. Industrial organizational practices reduce the investment in energy efficiency.

- Diffused industrial market makes it difficult and costly to move diverse customer segments to invest in deeper levels of EE.

In response to these challenges, a complimentary, integrated suite of program intervention strategies will be actively delivered to customers based on their individual energy habits using data analytics. There will be a greater focus on deeper, more comprehensive solutions and permanent behavioral changes to the customer’s energy consumption patterns. Ultimately, a set of key desired outcomes will be achieved that will enable the industrial customers, across all segments, to naturally adopt energy efficiency solutions as part of their business operations.

B. Market Characterization

Southern California, and specifically, the SoCalGas service area, is a prime industrial market due to the proximity of the ports of Los Angeles and Long Beach and the thriving southern California economy. SoCalGas has approximately 17,700 industrial customers that collectively consume 4 billion therms of natural gas annually. In recent years, the SoCalGas industrial sector has remained relatively stable, and has strongly recovered since the economic recession of 2008-2009. The vacancy rate of industrial real estate, a key economic indicator, has steadily declined from a high of about 6% in 2011 to 1.2% in 2016 (Quarter 1), and Los Angeles exhibits the lowest vacancy rates of the ten largest markets across the United States. Aside from economic cycles and macro-economic trends, other key industrial market drivers include: equipment efficiency code increases (boilers), emissions standards increases (NOx, GHG), state-specific legislation such as the passage of AB 32, and transportation and logistics (port congestion, E-commerce), among many others.

1. Customer Landscape

a. Natural Gas Consumption

Customer Size	2015 Number Customers	2015 Usage MM Therms
Large/Med	1,400	4,126
Small	1,100	27.5
Micro	15,300	16.5
Total	17,800	4,170

Industrial Sector Energy Usage

In 2015, SoCalGas industrial customers consumed 4.17 billion therms of natural gas, as shown in Table B.1. By NAICS segment, Refineries consumed approximately 34% of all of the annual natural gas usage in the industrial sector, almost 1.42 billion therms. Natural gas used for industrial processes accounts for nearly 60% of gas used in this sector in 2015, as shown in Figure 1.1.

Figure 1.1: 2015 Industrial Usage by End-Use

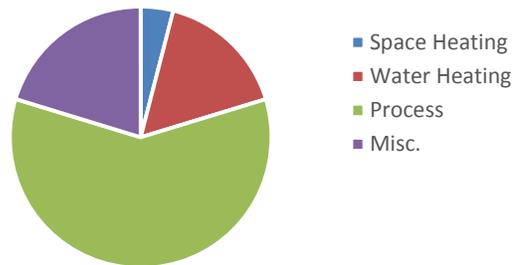
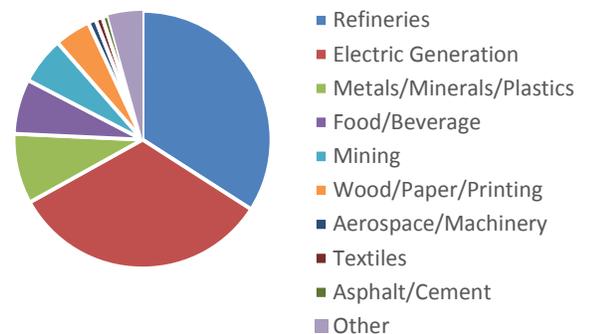


Figure 1.2: 2015 Industrial Usage by Segment



Usage By Customer Size

Annual natural gas usage is a key segmentation variable of the SoCalGas industrial sector as shown in Table B.1. At the highest level, this sector is divided into two primary segments based on average annual gas usage. The Medium/Large segment includes approximately 1,400 industrial facilities that each consume greater than 50,000 therms per year. This segment accounts for about 8% of the total number of industrial customers yet accounts for about 98% of industrial sector natural gas consumption. Though individual account consumption varies widely, Medium/Large industrial facilities each consume on average over 1.9 million therms per year.

In contrast, the small-sized (<50,000 therms annually) customer includes approximately 16,400 accounts. Small customers account for about 92% of the industrial accounts, but only about 2% of annual gas consumption. On average, facilities in this segment each consume 2,700 therms per year. The small-sized customer can be further disaggregated. Notably, the majority of the small facilities (94%) consume under 12,000 therms per year and are considered micro customers. The micro-industrial customers are not likely to use natural gas, in any significant way, in their processes to produce output, and thus natural gas usage is a low portion of the micro-facility energy cost. On average, micro-facilities consume 1,100 therms per year similar to a small commercial customer.

Usage by Customer Segment

SoCalGas' industrial customers are segmented into nine distinct NAICS categories, as shown in Figure 1.2. Aside from the Other segment, the Metals/Minerals/Plastics segment is the most prevalent with 4,411 accounts, or 23% of SoCalGas industrial accounts.

b. Market & Economic Potential

The estimated market and economic EE potential, over the next ten years, is shown in Figure 1.3. There exists a significant gap between market and economic EE potential within the industrial sector. Both economic and market EE potential trend slightly upward through 2023. Within the industrial sector, certain customer segments will experience an increase in EE market potential while other segments are expected to decrease in market potential over the next few years. Specifically, the EE market potential is projected to increase in the Metals/Minerals/Plastics segment over the next few years. In contrast, there is a steady, yet declining market potential projected for the Refinery, Wood/Paper/Printing and Textile segments. While the Aerospace/Machinery and Food/Beverage segments are projected to remain steady in potential over the next decade.

Figure 1.3: EE Potential - Industrial - Market & Economic
By Year



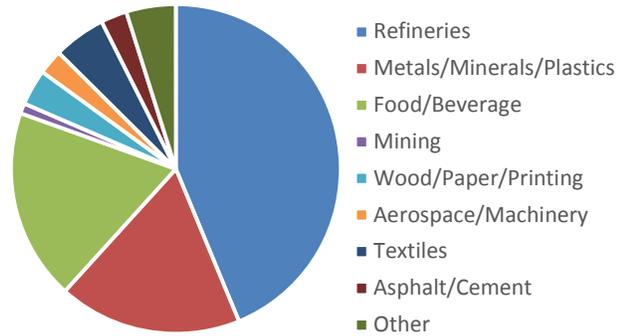
Historical Sector Performance

Segment

The industrial sector programs delivered approximately 42% of the SoCalGas portfolio savings. Notably, from 2013 to 2015, SoCalGas industrial customers saved 74 million therms of gas, or 2% of total annual industrial gas consumption. Industrial gas savings account for approximately 36% of SoCalGas' entire portfolio during this period, which does not include savings attributable to mining or agriculture.

Refineries accounted for the largest portion of industrial sector program energy savings with 32.4 million therms saved from 2010 to 2015, as shown in Figure 1.4. Other segments that account for large portions of total savings include Food/Beverage (2.3 million therms annually) and Metals/Minerals/Plastics (2.2 million therms annually).

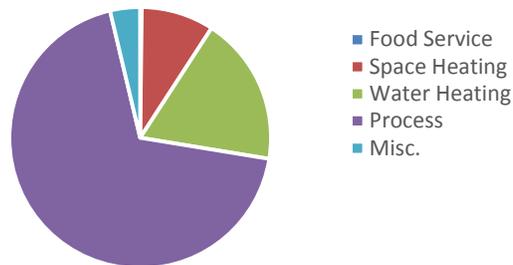
Figure 1.4: 2010-2015 Industrial Energy Savings by Segment



End-Use

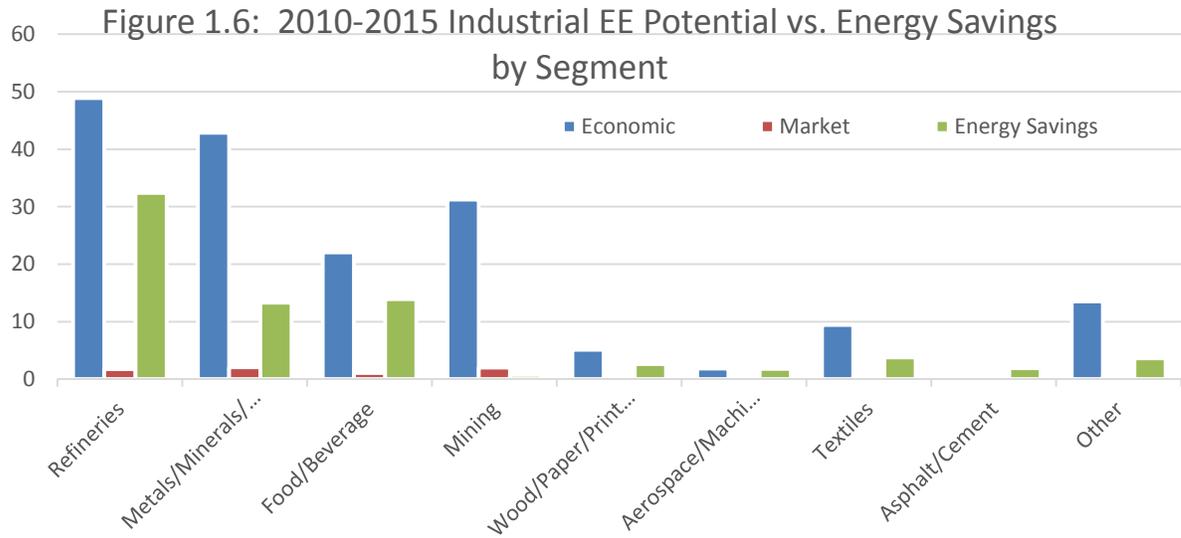
Figure 1.5 depicts annual energy savings of industrial sector by end use. Approximately two-thirds (68%) of the energy savings are associated with process heat, followed by 19% from water heating measures. The majority of industrial energy efficiency savings results were produced by the customized incentives program. The majority of savings came from process heat measures, whereas most of the energy savings from the deemed incentives program came from water heating measures.

Figure 1.5: 2010 - 2015 Energy Savings by End-Use



EE Potential & Realized EE Savings

A comparison of market potential with realized energy savings, by NAICS segment, is shown in Figure 1.6. The realized energy savings are considerably higher than market potential for the Refineries segment and Food/Beverage segment indicating there still exists obtainable economic EE potential in these segments. In contrast, many other segments such as Aerospace/Machinery, Mining, and the Wood/Paper/Printing have a high potential for energy savings, but still have low participation rates.



2. Market Intelligence

EE Equipment Sales Share

Due to the diverse and unique segments within the industrial sector, there is no set of common equipment used across the sector. Industrial processes tend to be very distinct among the industrial segments.

However, industrial customers do have facilities that have similar energy usage patterns as commercial customers. These industrial facilities typically use gas for space heating and water heating. Tankless water heating is the most energy efficiency technology available for these industrial facilities. However, there is a very low market adoption (<XX%) due to the cost and perceived limited benefit of converting to a tankless water heating system. Conversely, the industrial sector has a higher adoption of more efficient HVAC systems but still lags behind the commercial sector. Overall, market adoption levels of EE equipment vary among segments and equipment.

In order to increase the purchase of EE equipment, SoCalGas will place a heavy focus on increasing market adoption of EE equipment where market adoption is low among the various customer segments and sizes. Several recent market assessments studies on various industrial segments provide specific technologies with energy efficiency potential. These measures will be the focus of the industrial program offerings. A combination of comprehensive direct install, on-bill repayment, downstream and midstream EE equipment incentives will be actively offered to all customers especially those customers with the greatest potential EE benefit. Outreach efforts will focus on informing customers of segment-specific EE solutions along with technical assistance to promote the installation of EE equipment.

Key Market Actors

In order to increase market adoption of EE equipment in the industrial sector, it will require working with key market actors that can assist in transforming the market through the various program intervention strategies. The market actors include equipment manufacturers, distributors, and retailers to assist in permanently modifying equipment stocking habits as well as customer perception and acceptance of EE equipment. Other market actors include influential industry associations that can inform and influence specific-customer segments within the industrial sector. With significant levels of regulation applied to this industry, partnering with various regulators (e.g., Air Quality Management District or AQMD) to encourage deeper and more comprehensive EE will be key.

3. Industry Trends

Southern California, and specifically, the SoCalGas service area, has been a prime industrial market due to the proximity of the ports of Los Angeles and Long Beach. SoCalGas has approximately 17,700 industrial customers that collectively consume 4 billion therms of natural gas annually.

In recent years, the SoCalGas industrial sector has remained relatively stable, and has strongly recovered since the economic recession of 2008-2009. The vacancy rate of industrial real estate, a key economic indicator, has steadily declined from a high of about 6% in 2011 to 1.2% in the first quarter of 2016,¹ and Los Angeles exhibits the lowest vacancy rates of the ten largest markets across the U.S.²

¹ "Southern California Industrial Real Estate Market Heats Up." Journal of Commerce. October 9, 2014.

² "Industrial Markets in Southern California Show Sustained Strength in Q1 2014." Accessed at <http://www.cbre.us/o/losangelesmarket/los-angeles-media-center/Pages/INDUSTRIAL-MARKETS-IN-SOUTHERN-CALIFORNIA.aspx>

Aside from economic cycles and macroeconomic trends, other key industrial market drivers include: equipment efficiency code increases (boilers), emissions standards increases (NOx, GHG), legislative mandates, and transportation and logistics (port congestion, E-commerce), among many others.

Key trends^{3,4} in the industrial market within southern California include:

- Need to develop buildings to accommodate product demand, to move closer to customers or shipping centers, or to repurpose existing facilities.
- Recent drop in oil prices has increased pressure on oil producers to reduce the cost of production. In addition, cashflow for minor producers will be low and interest in updating equipment will be even lower.
- New construction for the industrial sector is gaining momentum, especially in the goods movement as well as the distribution and technology sectors. The outlook for industrial development is much more optimistic, especially for warehouse and distribution facilities, data centers, and research and development (R&D) centers.
- The food processing industry continues to be slow to adopt new technologies as the industry is heavily regulated by food safety and sanitation standards. Any energy efficiency upgrades activities cannot jeopardize the facility's compliance with food safety and sanitation standards. In addition, Title 24 captures most energy efficiency opportunities for boiler measures; facility managers have limited opportunities beyond Title 24 requirements.
- In the textile segment, local manufacturing employment is not likely to significantly increase due to increasing overseas costs, but creative design work, merchandizing, and wholesaling will continue to grow.
- Port activity and the growing importance of e-commerce continue to drive improvement in the Inland Empire's industrial real estate market. The Inland Empire is one of the strongest and most dynamic industrial markets in the nation, benefiting from logistics advantages, high demand, growing lease rates, and a substantial amount of available land for future industrial projects. The outlook for the market continues to be positive through 2016. Alone among the southern California five-county region, the Inland Empire's new development and construction is expected to be strong with demand easily absorbing new supply.
- In the wastewater treatment sub-segment, new construction and expansions are being planned at existing plants. These projects are planned years in advance and present excellent opportunities to facilitate installation of the most efficient equipment. In addition, emerging new processes are being considered that could improve on current plant energy efficiency.

³ ECONOMIC FORECAST AND INDUSTRY OUTLOOK California and Southern California Including the National and International Setting, Los Angeles County Economic Development Corporation, February 2016.

⁴ Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): New Opportunities for Oil and Gas Extraction and Produced Water Management and Recycling. CALMAC Study ID SCE0377.07. Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): Wastewater Treatment Facilities. CALMAC Study ID SCE0377.05. Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): Food Processing Industry. CALMAC Study ID SCE0377.06. Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): Integrated Design for New Construction. CALMAC Study ID SCE0377.01.

4. Sector Influences

a. Applicable Legislation and Regulatory Directives

There are a number of newly adopted legislative bills providing specific guidance for the future of energy efficiency in California. From Senate Bill (SB) 350 to Assembly Bills (AB) 793, 758 and 802, there are numerous directives that are helping to shape the next generation of energy efficiency program offerings. SB 350 sets forth a goal to double the levels of energy efficiency in California by 2030. With this goal set, a number of legislative and regulatory directives are provided to SoCalGas, and other program administrators, to help shape the energy efficiency business plans. The CPUC has also issued guidance to program administrators on how to further formulate the energy efficiency business plans. In response, SoCalGas has reshaped existing program strategies and added new ones to meet these specific directives. A summary of the recent legislative and regulatory directives along with SoCalGas' proposed program strategies to address these directives are detailed in Appendix B.

b. EM&V Study Recommendations & Observations

The evaluation, measurement, and verification (EM&V) process includes a number of industrial sector-related market studies, load impact, programs, process evaluations, and potential studies on energy efficiency programs and market segments.

The industrial sector business plan incorporates, with and without modifications, various recommendations that have not already been incorporated into the existing energy efficiency programs. A list of referenced EM&V studies directed at the industrial sector is provided in Appendix C of this business plan chapter.

c. External Stakeholder Input

As part of the EE business planning process, SoCalGas received valuable input from various external stakeholders primarily through the California Energy Efficiency Coordinating Committee. The stakeholder input, in part, helped shape the program strategies offered in the business plan. Specific CAEECC recommendations and corresponding responses are shown in Appendix D of this business plan chapter.

C. Vision, Goals, Objectives and Sector Strategies

The industrial sector vision, goals and objectives set the tone and direction for the next generation of program offerings. It is vitally important that they are clear, concise and connected to California's overall energy efficiency vision. The industrial sector business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape the industrial sector vision. The business plan has a number of other influences including: Commission policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input, and program experience.

The industrial sector goals and objectives were borne from the energy efficiency business planning efforts and reflect the areas of focus needed to achieve the sector vision. In addition, sector-specific tactical objectives are provided to set clear and tangible tasks that support the sector goals and objectives. Over time, the goals and corresponding objectives may be reset to adapt to changes in the industrial market, regulatory policies, laws, and customer response to program offerings.

1. Industrial Sector Vision

California industry will be vibrant, profitable and double its level of energy efficiency by 2030 through a suite of energy efficiency programs intended to:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services;
- Cultivate, promote and sustain lasting energy-efficient operations and practices; and
- Offer a range of simplified solutions that address the customer's energy efficiency needs.

2. Industrial Sector Goals

1. **Increase adoption of EE solutions by micro/small industrial group.** Achieve deeper energy efficiency levels in the micro/small industrial customer group across all segments through efficient customer targeting.
2. **Provide simple, no hassle, low cost customer transactions that encourages greater customer investment in EE.** Encourage greater participation in EE programs through bundling of strategies, simplified participation requirements, and one-touch customer outreach.
3. **Reshape industrial organizational practices to enable adoption of EE solutions as part of customer's industrial processes.** Achieve deeper energy efficiency through permanent changes in customer's operational and maintenance practices, behaviors, and equipment upgrades.
4. **Increase EE adoption levels across all industrial segments.** Apply data analytics, conduct efficient customer targeting, and offer simplified programs to increase customer awareness and adoption of EE practices and retrofits.

3. Industrial Sector Objectives

- **Increase EE adoption levels for smaller industrial customers.** Deliver simple, low-touch customer solutions that leverage data analytic techniques to target customers with EE potential in order to increase the efficiency of their facilities and operations.
- **Create simple solutions to attract more customers to EE.** Provide integrated energy solutions and products through a "one-stop shop" approach including pay-for-performance strategies to achieve deeper energy efficiency levels.
- **Change customer's organizational practices to make EE a key priority.** Permanently modify industrial practices to have organizations naturally consider and adopt EE solutions.
- **Deliver simple EE solutions across a very diverse industrial sector.** Increase EE adoption levels across all industrial segments through segment-specific tailored EE solutions that meet the needs of each customer segment.

4. Industrial Tactical Objectives

- i. Encourage industrial customers to engage in comprehensive energy efficiency solutions, leveraging pay for performance strategies coupled with simple M&V approaches.
- ii. Simplify program requirements to facilitate ease of program participation while maintaining appropriate program safeguards.
- iii. Educate industrial customers on energy and operational benefits to encourage customers to optimize and incorporate O&M actions to increase energy efficiency levels.
- iv. Create industry and/or customer benchmarks for individual segments and sub-segments (industry type, customer size) to inform and demonstrate EE benefits to customer.
- v. Motivate organizational leadership, in the large industrial group, to champion energy efficiency and incorporate EE as a key consideration into operational decision-making.

- vi. Create data analytic methods to efficiently identify facilities with high EE potential and provide tailored energy assessment that will encourage customers to make immediate EE behavioral changes and near-term retrofits.
- vii. Train customer's staff to become in-house experts on energy efficiency in order to foster permanent EE practices, improved process efficiency, and on-going benchmarking monitoring.
- viii. Collaborate with industry to identify emerging and renewed EE technologies and increase adoption levels.
- ix. Collaborate with financial market actors to enhance financing options for small industrial customers.

D. Program Intervention Strategies & Delivery

Since the 1990s, California has embraced the notion that energy efficiency program intervention strategies, coupled with government intervention (e.g., public policies and laws), can permanently reduce market barriers so customers can achieve higher levels of energy efficiency. In a transformed market, customers will naturally adopt higher levels of energy efficiency without the need for such program and government interventions. All programs, resource and non-resource, contribute to reducing market barriers in order to achieve the desired, long-lasting market effects.⁵ The current CPUC market transformation definition is stated below:

“Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.”⁶

In order to identify the appropriate program strategies, the business plan identifies sector-specific problem statements with corresponding resolutions or desired outcomes. Sector-specific program strategies are identified that will reduce the current market barriers. Program delivery will rely on a combination of third party delivered statewide and local programs. These programs will be supplemented with SoCalGas customer account executives that will enable third party program implementers and customers to work together. The business plan also identifies key sector-level metrics that will track the progress towards achieving the desired outcomes, as presented below.

⁵ “Market transformation is not a label that uniquely identifies certain energy efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees.” [A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel]

⁶ D.09-09-047, pp. 88-89.

1. Problem Statements & Market Barriers

a. Problem Statements

The industrial sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engaged the customer to capture both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

1. Low adoption of energy efficiency solutions by micro/small industrial group.
2. Complex and time-consuming process to pursue energy efficiency solutions.
3. Current industrial organizational practices do not realize the benefits of energy efficiency.
4. Diffused industrial market makes it difficult and costly to convince diverse customer segments to pursue EE.

b. Market Barriers

There are several market barriers present within the same market that inhibit the customer from achieving higher levels of energy efficiency. Market barriers are a byproduct of the market sector characteristics and the customer's behavior within that specific market sector. Program strategies are temporary interventions introduced into the market sector to create real, lasting market changes. The following are perceived market barriers, specific to the industrial sector, identified during the business planning process. Specific examples related to each market barrier are provided.

Table D.1: Perceived Market Barriers

Hassle or Transaction Costs	Project complexity inhibits EE. Micro/Small customers tend not to pursue energy efficiency due to the complexity of the EE project and the cost to support upgrades. The investment of time and resources often fall onto the smaller business owner who does not have the time to manage an EE retrofit.
High First Cost	Customer lacks capital to pursue EE. Access to funds, by the customer, for any capital expenditure is the largest barrier for industrial customers, both large and small.
	Complex and diverse industrial processes have high potential for energy savings but require specialized expertise. Industrial processes typically have large energy savings potential because of the energy intensity applied in production and the sub-optimum processes. However, many customers do not have the resources to obtain the expertise that could identify the potential EE savings.
Access to Financing	Limited access to adequate capital. Many small industrial customers have very little natural gas energy efficiency potential. The small size of the investment may not meet or exceed current financing thresholds (e.g., On Bill Financing has a \$5,000 minimum loan amount).

Table D.1: Perceived Market Barriers

Split (Misplaced) Incentive	<p>Difficult to influence EE decision-makers in small industrial customer group. Small industrial customers have a greater likelihood of leasing their facilities. Energy costs are paid directly by tenants, therefore, facility owners are not motivated to invest in efficient building systems.</p>
Diffused Market⁷ (Lack of Information)	<p>Industrial customer energy use varies greatly. The industrial sector, especially with the smaller-sized customers, is very diverse in their business operations and how they use natural gas. The customer diversity (e.g., aerospace/machinery, food/beverage, textiles, etc.) creates challenges to positioning EE in the market as customer awareness, perceptions, and energy usage vary greatly. For example, there are no common measures that are applicable to the varied-industrial processes.</p>
Lack of Information	<p>Industrial customers lack in-house expertise. Most industrial customers do not have the in-house expertise to develop benchmarking and baselines needed to track on-going energy use and efficiency gains.</p>
	<p>Lack of awareness of energy efficiency program assistance. Many smaller customers are not aware of the energy efficiency benefits or the programs that promote EE, especially, programs that are designed to assist the smaller industrial customer to achieve higher levels of energy efficiency.</p>
Organizational Practices or Customs	<p>Industrial customers do not establish energy use benchmarks or baseline. Establishing benchmarks and baselines for energy use is complicated by the variability of operations of facilities across the industrial sector. Even among organizations with very similar products, the manner in which energy is applied to form those products can be markedly different.⁸</p>
	<p>Customers lack in-house energy efficiency champions. Industrial customers often do not have sufficient staff to champion or pursue energy efficiency from within their organization. Moreover, staff members who manage industrial facilities have competing operational priorities that inhibit adoption of EE practices.</p>
	<p>Low priority for energy efficiency. Achieving operational goals is paramount to the customer’s continued business success. Large capital expenditures are focused primarily on achieving: certain payback periods, production targets, safety and regulatory compliance standards, and production schedules. Energy efficiency is of no or low consideration in the organization’s decision-making process.</p>
	<p>Complex decision-making processes. Industrial customers often involve numerous staff members in capital expenditure proposals; these employees have competing operational priorities. This complex decision-making process can result in very long project timelines, making it difficult for customers to plan for and participate in energy efficiency programs.</p>
	<p>Difficulty stopping production for improvements. Industrial operations often produce year-round with multiple production shifts including 24-hour operations. Energy efficiency improvements that require shutting down processes do not appeal to these process-intensive customers.</p>
Performance Uncertainties	<p>Low natural gas costs deter large investments in EE. Micro/small customers tend not to pursue energy efficiency due to the limited gas bill savings.</p>

⁷ Diffused Market is not a yet recognized market barrier. It represents the challenges facing market actors (ESCOs, contractors, manufacturers, etc.) that offer EE solutions to a diverse market. As a result, customers are unaware EE opportunities or remain unconvinced of the associated EE benefits.

⁸ Freeman, S. L., M. J. Niefer, et al. (1997). "Measuring industrial energy intensity: practical issues and problems." Energy Policy 25(7-9): 703-714

Table D.1: Perceived Market Barriers

	<p>Smaller customers not convinced of future EE benefits. Smaller industrial customers are skeptical about the potential benefits of investing in energy efficiency.</p>
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2. Desired Sector Outcome

A market effect is a permanent change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).⁹ The sector business plan identifies key milestones in the advancement towards a permanent market effect through a set of desired sector outcomes. In many cases, the desired outcome is expected well beyond the near and mid-term planning horizon, and ties to the 10-year vision for the sector. The business plan identifies the corresponding program intervention strategies that will be deployed to reduce the market barriers that will realize the desired sector outcome.

Table D.2: Market Sector Overview: Industrial Sector

Problem Stmt.	10-Year Vision	Desired Outcome	Program Strategies	Metric Type
Low adoption of energy efficiency solutions by micro/small industrial group.	High adoption of energy efficiency solutions by micro/small industrial segment.	Increase adoption of EE solutions by micro/small industrial group.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Industrial Outreach • Strategic Energy Management • Whole Building • Customer Incentives • Comprehensive Direct Install • Midstream EE Equipment • Financing • Emerging Technologies 	Increase in EE savings achieved by small (<50k therms) industrial customers.
Complex and time consuming process to pursue energy efficiency solutions.	Simple customer engagement with reduced customer transactional costs to facilitate the pursuit of energy efficiency solutions.	Provide greater number of simple, no hassle, low cost program transaction that encourages greater customer investment in EE.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Industrial Outreach • Strategic Energy Management • Customer Incentives • Comprehensive Direct Install • Midstream EE Equipment • Financing 	Increase in the number of industrial customer participating in EE programs.
Current industrial organizational practices do not realize the benefits of energy efficiency.	Create industrial organizational practices that promotes investment in energy efficiency.	Permanently modify industrial practices to have organizations naturally consider and adopt EE solutions.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Industrial Outreach • Strategic Energy Management • Customer Incentives • Comprehensive Direct Install 	Increase in EE savings achieved from process-related projects.

⁹ A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel, p. 9.

Table D.2: Market Sector Overview: Industrial Sector

Problem Stmt.	10-Year Vision	Desired Outcome	Program Strategies	Metric Type
			<ul style="list-style-type: none"> • Midstream EE Equipment • Financing 	
<p>Diffused industrial market makes it difficult and costly to convince diverse customer segments to pursue EE.</p>	<p>High adoption of energy efficiency solutions across all industrial segments.</p>	<p>Increase EE adoption levels across all industrial segments.</p>	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Small Industrial Outreach • Strategic Energy Management • Customer Incentives • Comprehensive Direct Install • Midstream EE Equipment • Financing 	<p>Increase in EE savings achieved by all industrial customer segments.</p>

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Figure 1: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME:</p> <p>Increase adoption of EE solutions by micro/small industrial segment.</p>	<p>High First Cost:</p> <p>Customer lacks capital to pursue EE. Complex and diverse industrial processes have high potential for energy savings but require specialized expertise.</p>	<ul style="list-style-type: none"> Customer Incentives Direct Install Financing Strategic Energy Mgmt Retrocommissioning Technical Assistance
	<p>Split Incentive:</p> <p>Difficult to influence EE decision-makers in small industrial customer group. Small industrial customers have a greater likelihood of leasing their facilities.</p>	<ul style="list-style-type: none"> Intelligent Outreach Customer Incentives Direct Install Small Ind. Outreach Partnering
	<p>Organizational Practices:</p> <p>Industrial customers do not establish energy use benchmarks or baseline. No lack in-house energy efficiency champions.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Retrocommissioning Partnering Small Ind. Outreach
	<p>Diffused Market:</p> <p>Industrial customer energy use varies greatly.</p>	<ul style="list-style-type: none"> Partnering Intelligent Outreach Small Ind. Outreach
	<p>Access to Financing:</p> <p>Limited access to adequate capital.</p>	<ul style="list-style-type: none"> Financing Intelligent Outreach Partnering Small Ind. Outreach Technical Assistance
	<p>Hassle, Transactional Cost:</p> <p>Project complexity inhibits EE. Smaller customers tend not to pursue energy efficiency due to the complexity of the EE project and the cost to support upgrades.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Ind. Outreach Technical Assistance
	<p>Performance Uncertainties:</p> <p>Low natural gas costs deter large investments in EE. Smaller customers not convinced of future EE benefits.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Ind. Outreach Technical Assistance
	<p>Lack of Information:</p> <p>Industrial customers lack in-house expertise. Lack of awareness of energy efficiency program assistance.</p>	<ul style="list-style-type: none"> Intelligent Outreach Small Ind. Outreach Technical Assistance

Figure 2: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME: Provide greater number of simple, no hassle, low cost program transactions that encourages more customers to adopt EE solutions.</p>	<p>High First Cost: Customer lacks capital to pursue EE. Complex and diverse industrial processes have high potential for energy savings but require specialized expertise.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Customer Incentives Direct Install Financing Midstream EE Strategic Energy Mgmt. Retrocommissioning Technical Assistance
	<p>Hassle, Transactional Cost: Project complexity inhibits EE. Smaller customers tend not to pursue energy efficiency due to the complexity of the EE project and the cost to support upgrades.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Ind. Outreach Technical Assistance
	<p>Performance Uncertainties: Low natural gas costs deter large investments in EE. Smaller customers not convinced of future EE benefits.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Ind. Outreach Technical Assistance
	<p>Lack of Information: Industrial customers lack in-house expertise. Lack of awareness of energy efficiency program assistance.</p>	<ul style="list-style-type: none"> Intelligent Outreach Small Ind. Outreach Technical Assistance

Figure 3: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME: Permanently modify industrial practices to have organizations naturally (i.e., without program interventions) consider and adopt EE solutions.</p>	<p>High First Cost: Customer lacks capital to pursue EE. Complex and diverse industrial processes have high potential for energy savings but require specialized expertise.</p>	<ul style="list-style-type: none"> Customer Incentives Direct Install Financing Strategic Energy Mgmt. Retrocommissioning Technical Assistance
	<p>Organizational Practices: Industrial customers do not establish energy use benchmarks or baseline. No lack in-house energy efficiency champions.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Retrocommissioning Partnering Small Ind. Outreach
	<p>Diffused Market: Industrial customer energy use varies greatly.</p>	<ul style="list-style-type: none"> Partnering Intelligent Outreach Small Ind. Outreach
	<p>Hassle, Transactional Cost: Project complexity inhibits EE. Smaller customers tend not to pursue energy efficiency due to the complexity of the EE project and the cost to support upgrades.</p>	<ul style="list-style-type: none"> Intelligent Outreach Partnering Small Ind. Outreach Technical Assistance
	<p>Performance Uncertainties: Low natural gas costs deter large investments in EE. Smaller customers not convinced of future EE benefits.</p>	<ul style="list-style-type: none"> Intelligent Outreach Strategic Energy Mgmt. Small Ind. Outreach Technical Assistance
	<p>Lack of Information: Industrial customers lack in-house expertise. Lack of awareness of energy efficiency program assistance.</p>	<ul style="list-style-type: none"> Intelligent Outreach Small Ind. Outreach Technical Assistance

Figure 4: Market Barriers & Program Intervention Strategies

<p>DESIRED OUTCOME:</p> <p>Increase EE adoption levels across all industrial segments.</p>	<p>High First Cost:</p> <p>Customer lacks capital to pursue EE. Complex and diverse industrial processes have high potential for energy savings but require specialized expertise.</p>	<p>Customer Incentives</p> <p>Direct Install</p> <p>Financing</p> <p>Midstream EE</p> <p>Strategic Energy Mgmt.</p> <p>Retrocommissioning</p> <p>Technical Assistance</p>
	<p>Organizational Practices:</p> <p>Industrial customers do not establish energy use benchmarks or baseline. No lack in-house energy efficiency champions.</p>	<p>Intelligent Outreach</p> <p>Strategic Energy Mgmt.</p> <p>Retrocommissioning</p> <p>Partnering</p> <p>Small Ind. Outreach</p>
	<p>Diffused Market:</p> <p>Industrial customer energy use varies greatly.</p>	<p>Partnering</p> <p>Intelligent Outreach</p> <p>Small Ind. Outreach</p>
	<p>Hassle, Transactional Cost:</p> <p>Project complexity inhibits EE. Smaller customers tend not to pursue energy efficiency due to the complexity of the EE project and the cost to support upgrades.</p>	<p>Intelligent Outreach</p> <p>Partnering</p> <p>Small Ind. Outreach</p> <p>Technical Assistance</p>
	<p>Performance Uncertainties:</p> <p>Low natural gas costs deter large investments in EE. Smaller customers not convinced of future EE benefits.</p>	<p>Intelligent Outreach</p> <p>Strategic Energy Mgmt.</p> <p>Small Ind. Outreach</p> <p>Technical Assistance</p>
	<p>Lack of Information:</p> <p>Industrial customers lack in-house expertise. Lack of awareness of energy efficiency program assistance.</p>	<p>Intelligent Outreach</p> <p>Small Ind. Outreach</p> <p>Technical Assistance</p>

3. Program Intervention Strategies

To realize the desired sector outcomes, several coordinated and integrated program intervention strategies will be deployed throughout the various market channels to increase customer EE adoption levels. This will support the achievement of increases in the adoption of EE products and behavioral practices.

The industrial sector represents several unique customer segments that vary in size and type of operations. The large industrial sector represents the biggest potential for natural gas energy efficiency among all customer sectors. The key characteristics of the industrial sector include:

- Diffused market sector with a number of unique and varied customer segments;
- Small number of large customers who consume the vast majority of natural gas;
- Large number of smaller customers who do not use gas in their industrial processes; and
- Significant amount of untapped energy savings associated with changes in customer operations and practices.

Due to the limited natural gas usage among customers within this sector and the need to simplify customer engagement in the delivery of DSM programs, SoCalGas proposes to coordinate program delivery with other local utilities (electric, water), where practicable. This will allow for a single, simple customer engagement and will empower the customer to implement a holistic energy (and water) efficiency plan.

In certain instances, a customer may behave in manner similar to those in other sectors. For example, an industrial customer may also act as a commercial retailer in a shared facility. In those instances, strategies from various sectors will be offered to these multi-dimensional customers in a coordinated offering.

The following is a comprehensive list of program intervention strategies that will be directed at SoCalGas' customer sector. The strategies are intended to overcome the various market barriers identified in this business plan to achieve the desired sector outcomes. These strategies will be deployed in a cohesive manner at various stages during the execution of the business plan.

Upon Commission approval of this business plan, future implementation plans will be developed to describe the tactical approaches to implementing these program intervention strategies. Overall, the program intervention strategies are intended to:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services;
- Cultivate, promote and sustain lasting energy-efficient operations and practices; and
- Offer a range of simplified solutions that address the customer's energy efficiency needs.

Table D.3: Program Strategies by Customer Size: Industrial Sector
Summary: Program Interventions Strategies Across Customer Size

Intervention Strategies	Status	Micro	Small	Medium	Large
Partnering					
• Utility Partners	New	X	X	X	X
• Industry Partners	New	X	X	X	X
Intelligent Outreach					
• Data Analytics	New	X	X	X	X
• Virtual Engagement	New	X	X	X	X
• Facility Energy Advisor	Existing	X	X	X	X
• Energy Management Technology	New	X	X	X	X
• Sharing EE Best Practices	New	X	X	X	X
• Small Industrial Outreach	New	X	X		
Technical Assistance	Existing			X	X
Strategic Energy Management	New			X	X
Customer Incentives					
• Pay-for-Performance	New	X	X	X	X
• Customized Incentives	Existing		X	X	X
• Deemed Incentives	Existing	X	X	X	X
• Bundled Measures	New	X	X	X	
• Whole Building	Existing	X	X	X	X
Direct Install					
• Direct Install	New	X	X	X	X
• Comprehensive DI	New	X	X	X	X
Midstream EE Equipment	Existing	X	X	X	X
Industrial Financing	Existing	X	X	X	X
Innovative Design	Existing	X	X	X	X
Crosscutting Coordination					
• Emerging Technologies	Existing	X	X	X	X
• Codes & Standards	Existing	X	X	X	X
• Workforce Education Training	Existing	X	X	X	X

Table D.4: Program Intervention Strategies

Program	Status	Type	Timing	Descriptions
Partnering				Limited-partnership arrangements, deployed on an as needed basis that are intended to: increase the number of customers adopting energy efficiency; promote deeper, comprehensive energy efficiency; simplify customer engagement; and reduce program costs through a cost-sharing partner model based on equitably sharing of customer incentives and administrative costs among partners.
• Utility partnering	New	NR	Near, Mid-term	Facilitate the co-delivery of key program intervention strategies among gas and electric investor-owned utilities, publicly-owned utilities, program administrators, and water agencies.
• Industry partnering	New	NR	Near, Mid-term	Partnering will also be deployed, on an as needed-basis, among industry associations to promote EE solutions to a represented customer group.
Intelligent Outreach				To assist customers in identifying the greatest EE opportunities, improve cost efficiency in program delivery, segment-specific benchmarking and provide deeper, comprehensive energy savings solutions.
• Data analytics	New	NR	Near, Mid-term	Leverage AMI data to quickly and efficiently target facilities with the highest EE potential for customer. This will assist in encouraging the uninterested customer with the opportunity for immediate and direct financial benefits by incorporating energy efficiency into their operations. Benchmarking by segment and size will be a key element to this effort.
• Virtual energy audits	New	R	Near, Mid-term	Because of data analytics, energy audits will be able to recommend both optimization and O&M measures to customer decision-makers and facilities staff. O&M and optimization EE opportunities will be presented to facility staff to implement for immediate and persistent energy savings along with necessary training and education to permanently change the customer’s behavior. Consumer-friendly, on-going communication to inform the customer on their progress in maintaining and/or increasing EE levels within their facilities will be a permanent feature.
• Facility energy audits	Existing	R	Near-term	Offers onsite comprehensive assessments to identify EE opportunities and traditional data driven interactive tools designed to engage and motivate customers to reduce their energy consumption through customized program recommendations.

Table D.4: Program Intervention Strategies

Program	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Energy management technology 	New	R	Near-term	Leverages emerging management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and management technologies to permanently modify customer behavior, which will result in reliable energy efficiency savings. These technologies will also focus on appliances that can assist the customer to manage their energy, including proper equipment maintenance (e.g., HVAC self-diagnostic technology) to achieve optimal efficiency. Where practicable, the strategy will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency experience.
<ul style="list-style-type: none"> Industry EE best practices 	New	NR	Near, mid-term	Offer, along with industry groups, a collaborative forum to help inform, excite, and accelerate EE actions among like customers.
<ul style="list-style-type: none"> Small industrial outreach 	New	NR	Near-term	Target small-sized customers by applying data analytics, including a focus on rural and non-English speaking business owners, to help the customer understand how specific energy efficiency equipment retrofits (e.g., boilers), O&M, and optimization EE changes, based on their own unique energy usage profile, can improve their business operations. The industrial customers either use natural gas as part of their industrial process (larger consumer) or not (small consumer). The small industrial outreach strategy, in concert with the data analytics tactics, will group these customers accordingly and approach them differently. The larger consuming industrial customers will be approached with similar program strategies as the larger industrial customer along with a more comprehensive direct install offering. The small consuming industrial customer typically uses natural gas as a commercial and/or residential customer (e.g., water and space heating). As such, the appropriate commercial and/or residential program strategies will be directed at these lower energy-consuming customers.
Technical Assistance	Existing	NR	Near-term	The strategy will be focused on smaller industrial customers that lack the resources to pursue energy efficiency opportunities. Technical assistance is an information strategy focused on educating and training key facility personnel on EE practices and providing supplemental technical assistance in EE project development and implementation.

Table D.4: Program Intervention Strategies

Program	Status	Type	Timing	Descriptions
Strategic Energy Management (SEM)	New		Near-term	SEM is a proven program intervention strategy achieving deeper and permanent energy efficiency levels for larger operations in the industrial sector through improved customer operations and maintenance practices and EE equipment installations. SEM provides long-term consulting services for educating and training participating businesses’ staff to do the following: (1) develop and implement a long-term energy planning strategy; and (2) permanently integrate energy management into their business planning at all organizational levels, from the shop floor to corporate management.
Customer Incentives			Near-term	Facilitates customer choice by offering a <u>simplified</u> suite of financial incentives strategies to customers (and/or their ESCO) to reduce the high first cost barrier, the key market barrier for most customers. Although incentive-based strategies like pay-for-performance appeal to larger EE projects, in many circumstances, the deemed and customized incentive one-payment strategies are very effective in motivating the customer to install EE equipment. The following strategies will be offered in combination with other program strategies to encourage deeper, more comprehensive energy efficiency solutions and permanent EE behavior modification.
<ul style="list-style-type: none"> • Pay-for-performance 	New	R	Near-term	Targets more comprehensive EE projects. Customers will be encouraged to work with ESCOs, if needed, to participate in a pay-for-performance (P4P) strategy. The P4P strategy will provide for incentive payments to the participating customer over a pre-determined time period on preset payment intervals based on measured savings, using normalized meter data, with a baseline of existing conditions associated with O&M and behavioral actions and equipment retrofits.
<ul style="list-style-type: none"> • Customized incentives 	Existing	R	Near-term	Offers financial incentives for customized retrofit EE projects. The program offering features incentives based on calculated energy savings for measures installed as recommended by comprehensive technical and design assistance for customized retrofits and new construction. It offers a calculation method that can consider system and resource interactions, to support an integrated, whole system, and multi-resource management strategies.

Table D.4: Program Intervention Strategies

Program	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Deemed incentives 	Existing	R	Near-term	Offers financial incentives based on predetermined energy savings. It also features rebates per unit measure for installed energy-saving projects and provides the IOU, equipment vendors, and customers a simple transaction and encourages greater market adoption of emerging EE technologies and applications.
<ul style="list-style-type: none"> Small industrial bundled measure 	New	R	Near-term	Provides an integrated approach by bundling various measures together to provide an all-inclusive solution to the customer based on customer profile (segment, size, energy usage) - primarily for small/micro-sized customers. The bundled strategy will integrate education, financing, and technical assistance in support of the installation of EE measures.
<ul style="list-style-type: none"> Whole building 	Existing	R	Near-term	A process that views the building as a system, rather than collection of components, in which each system interacts with each other systems such as HVAC, the building envelope, and lighting. This strategy is also directed at the new construction segment by promoting integrated design through owner incentives, design team incentives, and design assistance to participants who design spaces that are energy efficient.
Direct Install			Near-term	Offers a standard direct install (DI) strategy targeted primarily at small/micro-sized customers that will deliver natural gas energy efficiency solutions, with electric and water efficiency, where feasible, to achieve near-term measurable results. A comprehensive direct install (CDI) tactic will extend beyond the standard DI offering achieve deeper, more comprehensive EE equipment retrofits. CDI will rely, in part, on ratepayer funds and leverage customer co-fund contributions and/or customer financing.
<ul style="list-style-type: none"> Standard Direct install 	New	R	Near-term	Targets small/micro-sized customers by leveraging the intelligent outreach strategy that will identify facilities with the greatest EE opportunity. The standard direct install offering will provide limited list of low/no cost EE measures. DI will install natural gas EE measures along with other similar electric and water efficiency measures, where practicable.
<ul style="list-style-type: none"> Comprehensive Direct Install 	New	R	Near-term	Encourages deeper energy savings by offering more comprehensive EE measures that are typically used by the targeted customer segment. CDI will offer qualified contractors that will engage directly with the customers to install measures. A co-pay option will be offered to the customer along with tailored on-bill repayment strategy to offset the initial cost of the EE equipment.

Table D.4: Program Intervention Strategies				
Program	Status	Type	Timing	Descriptions
Midstream EE Equipment	Existing	R	Near-term	Provides deemed incentives to manufactures and distributors that will be used to reduce the retail cost of natural gas EE equipment (e.g., tankless water heating). This offering will be coupled with a comprehensive, co-pay direct install strategy that can effectively deliver on-demand installation by trained and qualified contractors.
Industrial Financing	Existing	R	Near-term	Relies upon various financing vehicles including on/off bill repayment solutions to encourage customers to adopt deeper, more comprehensive energy efficiency solutions. For smaller customers, financing solutions will be encouraged to offset customer's financial contribution (e.g., co-pay) for an EE retrofit, such as comprehensive direct install, to overcome customer financial barriers.
Innovative Design	Existing	R, NR	Near-term	Will solicit for large=budget program designs to reach deeper levels of energy efficiency in various segments within the sector. The solicitations will be continuously offered through the Innovative Design for Energy Efficiency Application (IDEA365) solicitation in search of ways to capture EE savings in various segments within the sector.
Crosscutting				
Emerging Technology Introduction			Near-term	Actively introduce EE technology solutions that will be applicable to the customer sector and achieve customer adoption including a focus on technologies that can be used by small/micro customers.
• Scaled Field Placement	Existing	R	Near, Mid-term	Deliver scaled field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable customers.
• Demonstration Field Placement	Existing	R	Near, Mid-term	Conduct selective demonstration field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable customers.
Codes & Standards	Existing	NR	Near, Mid-term	C&S will work with the sector customers and contractor community to increase awareness of new codes and to support code compliance.
Workforce Education & Training	Existing	NR	Near, Mid-term	WE&T will provide classes, seminars, consultations, and demonstrations to support industrial customer and contractor training and awareness of EE technologies, quality installation and code compliance.

Note: R=Resource; NR = Non-resource

4. Program Delivery

Individual programs will be designed and delivered by third party providers based on the program intervention strategies presented in the industrial business plan. Some programs will be designed and

delivered through a statewide program implementer under contract by a lead program administrator. Other programs will be designed and delivered by third party implementers at a local or regional level. In certain instances, SoCalGas proposes to leverage existing resources (customer account representatives) to assist the customer and third party program implementer in the identification and implementation of specific customer projects.

a. Statewide Implementation

SoCalGas will collaborate and coordinate with other program administrators on the effective implementation of statewide program offerings. Programs designed to engage directly with specific market actors at the midstream and upstream market channels will be implemented on a statewide basis. Other downstream programs, beyond what is presented in the business plan, may also be considered candidates for statewide implementation throughout the duration of the business plan.

b. Third Party Implementation

Local and regional solutions are necessary for the achievement of the industrial sector vision, goals and objectives. Many of the current programs offered are done so in coordination with publicly-owned utilities (POUs). Such partnerships with POUs will continue at a local level. For example, SoCalGas has a strong partnership with LADWP, the largest municipality in the nation, to jointly design and deliver EE programs to a shared customer base. Such activities will continue either implemented by the POU and/or implemented by SoCalGas-selected third party program implementers. SoCalGas will also work with other POUs to identify good program candidates to join the statewide implementation efforts, where feasible.

c. IOU Implementation

SoCalGas proposes to continue implementation of its customer representatives to actively promote energy efficiency in coordination with third party program implementers. In the industrial sector, it is more efficient and productive to leverage the natural relationship between SoCalGas and its larger customers. As the trusted energy advisor, SoCalGas' customer representatives have an ongoing relationship with its customers on energy matters, including energy efficiency. SoCalGas proposes to continue to promote energy efficiency programs to the larger industrial customer base in order to improve the likelihood that customers will adopt energy efficiency.

5. Performance Sector Metrics

In order to gauge sector progress towards the achievement of the desired market effects, the business plan proposes key sector metrics. In order to properly monitor progress, the metrics will rely on data currently collected, tracked and verified as part of the program administrator's data requirements (e.g., energy savings, customer participation, etc.). This approach improves the accuracy and timeliness of metric tracking while keeping the monitoring costs to reasonable levels. The industrial sector metrics associated with each problem statement are provided in Appendix A.

6. Key Partners

The success of the industrial sector business plan will rely on a positive, collaborative relationship with a number of market actors, program administrators, regulators and government entities. Below is a list of key partners that will help SoCalGas successfully achieve the ambitious vision for the industrial sector.

Table D.5: Key Partners

Key Partners	Support Activity
<p>Program Administrators</p>	<ul style="list-style-type: none"> • Deliver dual-fuel programs to reach more customers; • Leverage all available best practices and promote statewide consistency, where appropriate; • Simplify program engagement; • Capture all energy efficiency benefits including operational energy savings; and • Conduct market research that will identify and better understand unique barriers to energy efficiency investments.
<p>Publicly-owned Utilities (POUs) and Water Districts</p>	<p>SoCalGas will actively coordinate with POUs and water agencies to effectively and efficiently deliver energy and water efficiency programs. SoCalGas will engage in partnership and co-delivery arrangements with POUs and water agencies when there is a shared customer base (gas, electric) to simplify the customer engagement and achieve higher levels of EE. SoCalGas will actively coordinate with POUs and water agencies throughout California and other regions to share best practices in program administration, design and delivery.</p>
<p>State and federal agencies</p>	<p>SoCalGas will work with state federal agencies (e.g., DFA, DWR, USDA) to promote greater levels of EE adoption throughout the various customer segments.</p>
<p>California Public Utilities Commission and Key Stakeholders</p>	<p>SoCalGas will work with the Commission and other key stakeholder to investigate ways to simplify program requirements and to identify policies that will recognize all energy efficiency benefits associated with EE ratepayer-programs.</p>
<p>Third-party Program Implementers</p>	<p>Solicit new and innovative programs from third-party program implementers to address the sector. Leveraging third-party programs allows program administrators to draw upon creative program solutions that can be quickly and effectively targeted to these customers. Continued collaboration with program implementers throughout the program’s lifecycle will be an integral part of the program’s success.</p>
<p>Local and State Governments</p>	<p>SoCalGas will leverage its existing partnerships with local and state government to assist in the development and implementation of program strategies directed at smaller industrial customer group.</p>
<p>Industrial Trade Organizations</p>	<p>Industrial trade organizations can provide an effective path to industrial sector collaboration, particularly by serving as a trusted a source of information about business concerns facing specific industrial segments. Trade organizations have the ability to survey their membership to find common concerns and potential solutions. Understanding these concerns can help program administrators construct value propositions and tailor their program offerings to best serve these customers. Trade organizations have an established communications channels with the industry that can facilitate education of industrial customers about energy efficiency programs through a variety of forums, such as social and print media, ad hoc round tables, monthly meetings, and regional or national quarterly or annual meetings. SoCalGas will collaborate with trade allies to increase program promotion and customer awareness of the benefits of energy efficiency investments.</p>

Key Partners	Support Activity
Industry Technical Community	Specialized technical assistance with expertise in specific industrial processes can be highly effective in identifying energy savings opportunities at industrial facilities. The expertise can be provided by resources that include utility in-house experts, independent technical consultants, and equipment vendors.
Equipment Vendor and Manufacturers	SoCalGas will actively work with equipment vendors and manufacturers to promote greater adoption of EE equipment among the various customer segments.
California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) for financing	Financing will be a key program intervention strategy to overcome the high first cost of EE in the sector. SoCalGas will continue its long-term collaboration with CAEATFA to design and promote innovative financing strategies that will encourage greater customer investment in EE.

E. Statewide Program Coordination

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and very collaborative, on-going relationship among all implementers and program administrators. A detailed discussion will be presented in the final business plan, which will include a process by which administrators will consult and collaborate among each other to ensure effective statewide implementation across all service territories.

F. Crosscutting Sector Coordination

1. Local Marketing and SW ME&O Integration

The sector programs will rely on a combination of locally targeted promotion of specific energy efficiency programs tailored to the various segments throughout the sector. There will be a focus on historically underserved customers with higher EE potential to encourage greater program participation.

As the statewide Marketing, Education, and Outreach (ME&O) program’s near-term goal is focused on the mass market customer (i.e., residential and small business owners), the industrial program will rely on the Energy Upgrade California efforts to inform small business owners on the importance of energy efficiency and their opportunities to act. The Small Industrial Outreach will provide customer-specific information and services to help the customer modify their energy consumption behavior and to install EE retrofits. The industrial sector program will also rely on targeted outreach efforts to inform larger industrial customers on the importance of energy efficiency, their opportunities to act and the benefits of their actions. SoCalGas will also actively participate in the both the development of the five-year ME&O Strategic Roadmap and Annual Joint Consumer Action Plans to coordinate program offerings with the statewide marketing efforts and to support the short and long-term goals of the ME&O program.

2. WE&T Integration

The Workforce Education & Training (WE&T) is well positioned in its role of facilitating training on the skills needed by the workforce to perform the type, level and quality of work to reduce energy consumption and achieve the energy savings targeted by the State. WE&T will provide classes, seminars, consultations, and demonstrations to support local government training programs for code compliance. WE&T will also assist industrial customers (and their staffs) by providing technical education and/or in-field training to help the industrial customer convert interest into EE actions.

3. Emerging Technologies

The ETP's work on exploring opportunities for large-scale energy-saving measures is among the most important ways in which it supports the industrial sector. Additionally, the ETP provides important data on non-energy issues regarding industrial equipment, such as market readiness and economics. Also, ETP collaborates with other utility stakeholders to explore innovative solutions such as meter-based verification, fault detection and diagnostics, targeted continuous energy improvements (CEI), and non-process technologies. In addition to bringing energy savings, these advancements can enable DR and IDSM strategies and help utilities meet legislative mandates, such as AB 802, AB 793 and SB 350. Compared with other sectors, individual EE interventions in the industrial sector tend more frequently to be custom and offer greater savings, though they are more expensive to deliver and administer. These large, custom interventions provide an opportunity for the ETP to offer support through evaluating and advancing process measures, as well as supporting opportunities for deeper savings through CEI. CEI can achieve savings beyond simple equipment upgrades by utilizing ETP-vetted solutions like energy benchmarking software that can help with implementation of AB 802, as well as advanced monitoring and analytical systems that quickly pinpoint malfunctioning equipment.

Beyond CEI, the statewide ETP identified supporting the evolution of EE portfolios to be more solution-driven rather than purely technology-driven as a major long-term goal. To achieve this, the ETP will investigate advanced meter-based verification approaches which directly measure energy savings of an equipment upgrade, rather than traditional methods which typically could only offer an estimate based on field or laboratory testing. Thus, a meter-based approach offers utilities and industrial customers a more accurate picture of energy savings and can also help identify problems in the installation process or if unexpected performance issues arise. Critical to this evolution is AB 802 which requires IOUs to count all savings that show up at the meter as decreased use, including savings achieved by process changes and maintenance.¹⁰

And when it comes to more traditional measures, the statewide ETP recognizes that equipment maintenance, downtime resulting from new equipment installation, and initial costs continue to be major drivers in industrial EE decisions. As a result, the ETP will continue to study both equipment performance and economics as part of the market assessment and field evaluation process. The ETP has a track record of successful interventions that helped bring EE solutions to this sector. Moving forward, SB 350 - which calls for a doubling of previous EE goals - will spur additional innovation and savings opportunities in these areas.

¹⁰ §381.2(b).

4. Codes & Standards

The Statewide Codes and Standards (C&S) Program saves energy on behalf of ratepayers by influencing standards and code-setting bodies, such as the California Energy Commission (CEC) and the Department of Energy (DOE), to strengthen EE regulations by improving compliance with existing C&S, assisting local governments to develop ordinances (reach codes) that exceed statewide minimum requirements. The C&S effort will also draw upon industrial customers, where applicable, into the code development in the early stages to advocate for codes and compliance-related matters.

5. Other DSM Programs

To assist customers in managing their energy, the program strategies presented in this business plan will be coordinated and integrated with other customer demand-side opportunities, where feasible.

a. Integrated DSM

The integrated Demand-side Management (IDSM) encourages the integration of a full range of DSM options such energy efficiency, advanced metering, low income energy efficiency, distributed generation, alternate fuel vehicles. In short, IDSM is fundamental to achieving California’s strategic energy goals, as presented in the CLTEESP. IDSM efforts will continue to identify and promulgate best practices, address implementation and program policy issues across customer DSM programs. IDSM will specifically look for integration opportunities, identify integration barriers, and work with both program administrator and program implementer staffs to promote the advancement of integration, using lessons learned and best practices to establish a continuous improvement process. Although, not a program, IDSM will help other DSM programs to integrate and compliment with each other facilitate a simple, effective DSM engagement with the customer.

b. Demand Response

The industrial sector business plan proposes to leverage emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and energy management technologies to permanently modify customer behavior which will result in reliable energy efficiency savings and serve to support utility demand response activities. Where practicable in these efforts, SoCalGas will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency and demand response experience.

c. Residential Rate Reform

Not applicable.

d. Integrated Demand Side Resources

(pending)

e. Alternate Fuel Vehicles

In California, SB 350, codified in Public Utilities Code § 740.12(a)(1), states the following goal: “Advanced clean vehicles and fuels are needed to reduce petroleum use, to meet air quality standards, to improve public health, and to achieve greenhouse gas emissions reduction goals.”¹¹ The industrial sector business plan proposes to increase awareness of alternative fuel vehicle options to serve the industrial

¹¹ Public Utilities Code § 740.12(a)(1).

sector transportation needs to significantly reduce NOx and GHG emissions. Consistent with SB 350’s goals to address barriers to access for low-income customers to zero-emission and near-zero-emission transportation options,¹² outreach efforts directed at industrial customers within disadvantaged communities will also emphasize the benefits and opportunities for alternate fuel vehicles supporting the industrial sector.

f. Energy Savings Assistance (Multifamily)

Not applicable.

G. Sourcing

Sourcing for the program intervention strategies will call upon the innovative proposals of the program implementer community and the unique market position of the utility. Specific programs will be designed and delivered in the appropriate market channel by third party implementers. The scope of the request for proposals for programs will be guided by the adopted program strategies represented in this business plan. The third party program implementer community will be called upon to propose specific program designs and delivery approaches as part of the program solicitation process. SoCalGas will collaborate with selected third party implementers to further program design to integrate with other energy efficiency program strategies within the portfolio and to increase the likelihood of success.

To maintain current efficiencies and avoid customer confusion and frustration, key customer services, in support of the energy efficiency portfolio, will be maintained by SoCalGas in close coordination with the program implementer. These customer services include: customer representative to promote EE programs and program implementer customer engagement; processing customer rebate payment for downstream programs; project engineering reviews; program inspections; utility website to promote and receive customer requests for participation; and managing customer requests/complaints to SoCalGas.

Consistent with a key principle of the EE rolling portfolio to promote a healthy and vibrant EE ecosystem in California, for both large and small providers, SoCalGas will release a series of competitive solicitations, on annual basis, to allow for continuous opportunities for the EE service provider community and to encourage ongoing innovation within the EE portfolio. SoCalGas plans to launch the first set of program solicitations in 2017 in expectation of Commission approval of the energy efficiency business plan application. The following provides the solicitation plan, including estimated timeline for each program solicitation and implementation, for the sector through 2020:

Table F.1: Program Solicitation Schedule			
Program Strategy	Program Tactic	RFP Release Date	Implementation Date
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD

¹² See SB 350 (Statutes 2015, Chapter 547), at Section 7. See CAL. PUB. UTIL. CODE §25327(d).

TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD

H. EM&V Considerations

The industrial sector contains a wide variety of industrial customers with very unique and divergent ways they use energy. There has been limited research on each of the different segments and sub-segments within the industrial sector especially a deeper examination of the small and medium-sized customers who are classified under the industrial sector.

The industrial customer can benefit greatly from permanent changes in their energy usage. For instance, there are several maintenance and operational changes that can have a great impact in the amount of energy consumed by an industrial-based process. Estimating the impact of behavioral measures will be paramount to the near and long-term success in achieving the overall goal of the industrial sector.

The following are recommendations to improve the body of knowledge regarding the industrial sector.

Market Research and Process Evaluation:

- Conduct a market study to identify the unique segments within the industrial sector and to examine their unique characteristics and trends within their specific segment or sub-segment.
- Interview medium/large industrial customers to identify where program participation process can be simplified.
- Target small to large industrial customers to identify industrial customers' values relating to financing capital expenditures and energy efficiency. This research will seek to better understand barriers such as production delays for efficiency improvement and will explore customers' value proposition(s) for energy efficiency.

Load Impact:

- Use normalized metered energy consumption data to determine the overall impact of O&M and behavior measures as an enhanced approach to quantify energy savings. For this approach, energy savings are calculated as the difference between the normalized metered energy consumption for baseline and post-intervention time periods.

Appendix A: Sector Metrics

Energy Efficiency Business Plans: Sector Metric Table - Industrial Sector									
Problem Statement	10-Year Vision	Desired Sector Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
1. Low adoption of energy efficiency solutions by micro/small industrial segment.	High adoption of energy efficiency solutions by micro/small industrial segment.	1. Increase adoption of EE solutions by micro/small industrial segment.	Partnering Intelligent Outreach Small Industrial Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing Emerging Technologies	Amount of EE savings achieved by small (<50k therms) industrial customers.	2015 Participation Levels.	Program tracking data	Increase EE savings from targeted customer group by 5% over 2015 levels by Year 3.	Increase EE savings from targeted customer group by 15% over 2015 levels by Year 7.	Increase EE savings from targeted customer group by 25% over 2015 levels by Year 10.
2. Complex program requirements and transactional costs reduce the customer's pursuit for energy efficiency solutions.	Simple customer engagement with reduced customer transactional costs to facilitate the pursuit of energy efficiency solutions.	2. Provide greater number of simple, no hassle, low cost program transactions that encourages more customers to adopt EE solutions.	Partnering Intelligent Outreach Small Industrial Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing	Number of industrial customer participating in EE programs.	2015 Participation Levels.	Program tracking data	Increase in program participants by 15% over 2015 levels by Year 3.	Increase in program participants by 35% over 2015 levels by Year 7.	Increase in program participants by 50% over 2015 levels by Year 10.

Energy Efficiency Business Plans: Sector Metric Table - Industrial Sector

Problem Statement	10-Year Vision	Desired Sector Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
3. Industrial organizational practices reduces investment in energy efficiency.	Create industrial organizational practices that promotes investment in energy efficiency.	3. Permanently modify industrial practices to have organizations naturally adopt EE solutions.	Partnering Intelligent Outreach Small Industrial Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment	Amount of EE savings achieved from process-related projects.	2015 Participation Levels.	Program tracking data	Increase EE savings from process-related projects by 5% over 2015 levels by Year 3.	Increase EE savings from process-related projects by 15% over 2015 levels by Year 7.	Increase EE savings from process-related projects by 25% over 2015 levels by Year 10.
4. Diffused industrial market makes it difficult and costly to move diverse customer segments to invest in deeper levels of EE.	High adoption of energy efficiency solutions across all industrial segments.	4. Increase EE adoption levels across all industrial segments.	Partnering Intelligent Outreach Small Industrial Outreach Strategic Energy Mgmt. Customer Incentives Direct Install Midstream EE Equipment Financing	Amount of EE savings achieved by medium (>50k therms) and large industrial customers.	2015 Participation Levels.	Program tracking data	Increase EE savings from targeted customer group by 5% over 2015 levels by Year 3.	Increase EE savings from targeted customer group by 15% over 2015 levels by Year 7.	Increase EE savings from targeted customer group by 25% over 2015 levels by Year 10.

Appendix B: Applicable Legislation and Regulatory Directives

Applicable Legislation	Program Intervention Strategies
SB 350	
§399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive certifies that the improvement or installation has complied with any applicable permitting requirements and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.(2) This subdivision does not imply or create authority or responsibility, or expand existing authority or responsibility, of a public utility for the enforcement of the building energy and water efficiency standards adopted pursuant to subdivision (a) or (b) of Section 25402 of the Public Resources Code, or appliance efficiency standards and certification requirements adopted pursuant to subdivision (c) of Section 25402 of the Public Resources Code.	Customer Incentives, SEM, Whole Building
§399.4 (c) The commission, in evaluating energy efficiency investments under its existing statutory authority, shall also ensure that local and regional interests, multifamily dwellings, and energy service industry capabilities are incorporated into program portfolio design and that local governments, community-based organizations, and energy efficiency service providers are encouraged to participate in program implementation where appropriate.	SEM, Customer Incentives
§399.4 (d) In updating its policies, the commission shall, at a minimum, do all of the following:	
(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.	All
(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.	Customer Incentives, SEM
(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.	Customer Incentives, SEM
(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results.	SEM, P4P, Deemed, Calculated
AB 793	
§717(3)(b) “Energy Management Technology” may include a product, service, or software that allows a customer to better understand and manage electricity or gas use in the customer’s home or place of business.	SEM, Intelligent Outreach

Applicable Legislation	Program Intervention Strategies
AB 758 (EE Building Action Plan)	
1.3.1 - Home Energy Rating System (HERS) II Using the HERS II Rulemaking process and modifying the HERS II whole-house assessment protocols to align with current home upgrade program practices and other relevant industry protocols.	n/a
1.3.2 - Minimum Standards for Smart Meter Data Analytics Establish minimum qualification standards and evaluation protocols for eligible low- and no-touch home energy assessment tools.	n/a
1.5.1 - Improve Clarity and Ease of Use Develop approaches to simplify implementation of Building Efficiency Standards (BES) for existing buildings by unifying definitions with industry practice, by clarifying code requirements, and through the use of expert systems or other navigation tools.	Codes & Standards
1.5.3 - Training and Communication Enhance communication, education, and interactions with local governments to ease compliance with and enforcement of the standards. Develop effective consumer communication materials to market nonenergy benefits of compliance.	Codes & Standards
1.6.3 - Advocacy and Technical Support Support enhanced federal standards and participate in proceedings of the federal government and neighboring countries (Mexico, Canada).	Codes & Standards
1.6.5 - Plug-Load Management Programs Develop, encourage, and offer incentives for turnover of existing stocks and use of plug-load management devices and software and novel approaches to reduce standby consumption.	Intelligent Outreach (EMS), Midstream Appliance
1.6.6 - Specification Development In some cases, new appliance standards cannot be adopted because of federal preemption or application-specific cost-effectiveness. Develop purchasing and replacement guidelines for products where large savings opportunities exist, but new standards cannot be adopted.	
1.6.7 - Purchase Agreements Use large organization purchasing power to increase the efficiency of equipment and devices (lighting, appliances and so forth) used by employees and/or renters. State and local government procurements and low-income programs will focus on high-efficiency products. Promote adoption of such purchase agreements by managers of large multifamily property portfolios.	n/a
1.8.2 - Market Transformation Program Portfolios Evolve the energy efficiency program portfolios to focus more explicitly on market transformation activities in the upgrade marketplace. 1. Understand the phenomenon of code shortfall in existing buildings, and mobilize projects to close any gaps. 2. Revisit administration of market transformation efforts.	All

Applicable Legislation	Program Intervention Strategies
<p>2.1.2 - Benchmarking Data Infrastructure Map meters to physical buildings and upload whole-building consumption data to Portfolio Manager, as needed.</p>	Intelligent Outreach
<p>2.1.3 - Easy-to-Access Data and Analytics Provide simple, standardized access to customers and their chosen service providers so they can easily understand their real-time energy use and assess needs. Develop solutions for multifamily buildings, particularly low-income and commercial buildings, including provision of regular and frequent building-level usage reports. Allow consumers to share/donate their data for consideration of possible EE upgrades.</p>	Intelligent Outreach
<p>2.2.1 - Enhanced Program Design and ME&O Transition to more multifaceted, incremental, and performance-oriented efficiency programs.</p> <ol style="list-style-type: none"> 1. Incorporate all end-use energy sources, including water, plug loads, pools, irrigation, and exterior uses, into programs. 2. Incorporate trigger points to help reach consumers at key transaction points. 3. Establish behavior and operations as central elements impacting building energy consumption by incorporating them into programs, tracking, and evaluating. 4. Use ME&O to create a path that can connect consumers across programs and bundle actions based on their needs. 	Partnering, Intelligent Outreach, Customer Incentives, SEM, Direct Install, Financing, Midstream Appliance, Whole Building
<p>2.2.2 - Expand Behavior Programs Leverage current and expected innovations made possible with access to AMI data; plan and implement behavior programs with expanded scope and market reach.</p>	Intelligent Outreach, SEM
<p>3.1.1 - Sustainable and Effective Program Delivery Enhance program portfolios to reduce transaction costs and dramatically increase effects in hard-to-reach sectors.</p> <ol style="list-style-type: none"> 1. Streamline program requirements and operational procedures. Expand statewide programs with uniform designs. 2. Improve and expand direct-install programs for hard-to-reach populations. 3. Develop and implement new program designs for small and medium commercial and multifamily buildings. 4. Implement rolling program portfolios to solidify long-term funding commitments that align with business investment decisions. (Align with Strategy 1.9.) 	Intelligent Outreach, Small Industrial Outreach, Customer Incentives, SEM, Direct Install, Whole Building

Applicable Legislation	Program Intervention Strategies
<p>3.2.1 - Performance Assurance Confirm energy savings outcomes using performance-based validation methods.</p> <ol style="list-style-type: none"> 1. Develop effective verification tools to substantiate predicted energy savings for the residential and small/medium commercial sectors. 2. Promote widespread use of tools that provide feedback on actual delivery of promised savings. 3. Provide quick and easy access to energy usage data for use in performance verifications. (See Strategies 2.1.3 and 2.1.6.) 	Codes and Standards, Intelligent Outreach, SEM
<p>3.2.2 - Incentives Tied to Performance Employ performance-based incentives to support savings realization and Local Government (LG) persistence, in tandem with finance mechanisms (Goal 5) that manage cash flow.</p>	Customer Incentives (P4P), Whole Building, SEM
<p>3.4.2 - Develop and/or Enhance ZNE Retrofit Design Tool Kits Identify building/business types well-suited for ZNE retrofits but where current ZNE guidance is scarce. Provide design and financing guidance to ease adoption of ZNE retrofit strategies.</p>	Codes & Standards
<p>3.4.3 - Provide Incentives and Other Financing Mechanisms Make financing widely available for ZNE retrofits.</p>	Financing
<p>4.1.1 - Pilot Energy Asset Ratings With the Real Estate Industry Introduce the uniform property valuation approaches established in Strategy 1.4 to appraisers, commercial leasing agents, and other real estate actors.</p> <ol style="list-style-type: none"> 1. Partner with California appraisers, leasing agents, local governments, and rating tool providers to pilot the building energy asset rating methods adopted in Strategy 1.4. 2. Modify the final specifications for the uniform building energy asset rating methods based on industry feedback gathered in the above pilots. 	Workforce Education and Training
<p>4.1.2 - Energy and Water Cost Savings Develop and compile information on building life-cycle and/or building occupant tenure cost reductions for energy and water efficiency measures. Develop separate cost savings estimates as needed for each unique commercial business category and building type, as well as unique residential dwelling type. Incorporate regional (for example, climate) differences in expected cost savings information, when appropriate.</p>	Partnering
<p>5.2.3 - Split Incentives Assess and encourage new cost recovery mechanisms such as surcharge on tenant meters or “green leases” to surmount “split incentive” dilemma.</p>	
<p>5.7.1 - Balanced Assistance Options Work with stakeholders to assess optimal balance of assistance options across financing, on-bill repayment tied to meter, and grants or direct installation to maximize water and energy efficiency levels, using ratepayer, occupant, or other funds.</p>	Partnering

Applicable Legislation	Program Intervention Strategies
<p>5.7.3 - Multifamily Buildings Integrate low-income household services with building owner eligibility for regular energy efficiency programs to increase efficiency levels in multifamily buildings with low-income occupants.</p>	<p>n/a</p>
AB 802	
<p>"§381.2(b) Recognizing the already underway 2015 commission work to adopt efficiency potential and goals, the Energy Commission work on its 2015 energy demand forecast, and the need to determine how to incorporate meter-based performance into determinations of goals, portfolio cost-effectiveness, and authorized budgets, the commission, in a separate or existing proceeding, shall, by September 1, 2016, authorize electrical corporations or gas corporations to provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings. Those programs shall include energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations, as well as operational, behavioral, and retrocommissioning activities reasonably expected to produce multiyear savings. Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission. The commission may adjust the energy efficiency goals or targets of an electrical corporation and gas corporation to reflect this change in savings estimation consistent with this subdivision and subdivision (d)." [Emphasis, added]</p>	<p>SEM, P4P, Intelligent Outreach</p>
<p>"(c) Effective January 1, 2016, electrical corporations and gas corporations are authorized to implement the provisions of subdivision (b) for high opportunity projects or programs. The commission shall provide expedited authorization of high opportunity projects and programs to apply the savings baseline provisions in subdivision (b). (d) In furtherance of subdivision (b), the commission, in consultation with the Energy Commission, shall consider all of the following: (1) The results of any interagency baseline assessment. (2) Any available results from investor-owned utility baseline pilot studies ordered in D.14-10-046. (3) Information necessary to ensure consistency with the energy forecast and planning functions of the Energy Commission and the Independent System Operator. (e) The commission may direct electrical corporations and gas corporations</p>	<p>SEM, P4P</p>

Applicable Legislation	Program Intervention Strategies
to make filings that are necessary to ensure coordination with the energy forecast and planning functions of the Energy Commission and the Independent System Operator."	
§399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive provides proof of permit closure and certifies that the improvement or installation has complied with any applicable permitting requirements and any specifications or requirements set forth in the California Building Standards Code (Title 24 of the California Code of Regulations), and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.	P4P, SEM, Calculated, Deemed
<p>"(d) The commission, in a new or existing proceeding, shall review and update its policies governing energy efficiency programs funded by utility customers to facilitate achieving the targets established pursuant to subdivision (c) of Section 25310 of the Public Resources Code. In updating its policies, the commission shall, at a minimum, do all of the following:</p> <p>(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.</p> <p>(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.</p> <p>(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.</p> <p>(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results."</p>	P4P, SEM, Intelligent Outreach, Calculated, Deemed

Sector-specific CPUC Regulatory Directives	Cite	Response
<p>As the strategic energy management approach leads to capture of additional savings from behavioral, retrocommissioning, and operational activities, as well as identification of bigger opportunities and tracking of projects planned by the customer, we direct the utilities to modify their continuous energy improvement programs or develop new programs to offer a robust strategic energy management program, using a statewide program design. We note in Section 4.9.2 below that strategic energy management appears to be a candidate for statewide implementation and strongly urge the utility program administrators to select this as one of the program areas that falls under this approach.</p>	<p>D.16-08-019, p. 42</p>	<p>See, Program Strategies. The industrial sector business plan proposes a new Strategic Energy Management program strategy with key design features based on best practices from other SEM program delivered outside California. The proposed program strategy represents a coordinated statewide effort across all IOU program administrators.</p>
<p>In addition, we are also strongly considering opening a separate inquiry or rulemaking into the approaches for energy efficiency specific to the industrial sector, since this sector represents such a large amount of potential energy savings, and also is less amenable to many of the programmatic approaches we use for the commercial and residential sectors. It likely warrants a special focus. We will wait until we see the business plans from the program administrators first, before deciding whether and how to approach such an inquiry. It is possible this could be handled as part of Phase III of this proceeding. This or a new venue could also be the place to resolve any issues where consensus is not reached through the collaborative process described above.</p>	<p>D.16-08-019, p. 43</p>	<p>See, Program Strategies. The industrial business plan proposes an innovative, comprehensive portfolio of program strategies designed for the unique market characteristics of the industrial sector. By applying the latest techniques in data analytics, the portfolio can now apply progressive customer segmentation to identify customers, large and small, with high EE potential within their facilities. Leveraging new program concepts such SEM and pay-for-performance in close collaboration with regulators and industry experts, the business plan is set to capture behavioral-based energy savings along with traditional retrofit opportunities throughout the diverse industrial sector.</p>

Appendix C: EM&V Recommendations & Observations

CPUC EM&V Studies:

- Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): New Opportunities for Oil and Gas Extraction and Produced Water Management and Recycling. CALMAC Study ID SCE0377.07.
- Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): Wastewater Treatment Facilities. CALMAC Study ID SCE0377.05.
- Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): Food Processing Industry. CALMAC Study ID SCE0377.06.
- Navigant Consulting, Inc.; ASW Engineering Measure, Application, Segment, Industry (MASI): Integrated Design for New Construction . CALMAC Study ID SCE0377.01.
- CADMUS; California Joint Utilities Financing Research: Existing Programs Review. CALMAC Study ID PGE0338.01.
- Xenergy, Inc., California Industrial Energy Efficiency Market Characterization Study, prepared for Pacific Gas and Electric Company. December 2001.
- Heschong Mahone Group, Inc. Non-Residential Process Evaluation Study: Main Report, prepared for the Southern California Gas Company. March 2012. CALMAC Study ID SCG0213.01.
- Itron, Inc. 2013 Custom Impact Evaluation: Industrial, Agricultural, and Large Commercial, prepared for the California Public Utilities Commission. July 2015. CALMAC Study ID CPU0107.01.
- Navigant Consulting, Inc. Energy Efficiency Potential and Goals Study for 2015 and Beyond, prepared for the California Public Utilities Commission. September 25, 2015.
- The Cadmus Group, Inc., Impact Evaluability Assessment of California's Continuous Energy Improvement Pilot Program, prepare for the California Public Utilities Commission. October 2013. CALMAC Study ID CPU0067.01.
- Efficiency Valuation Organization. International Performance Measurement & Verification Protocol: Concepts and Options for Determining Energy and Water Savings Volume I. 2012.
- Energy & Resource Solutions. Nonresidential Program Assessments: Third-Party Industrial and Agricultural Program Group Public Draft Report, prepared for the California Public Utilities Commission and the California IOUs. July 2012.

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
0117	There are near term barriers to getting custom programs going strongly. There are various levels of challenges, including CPUC rules but also communication from the IOUs re: rule changes. There was also direction to engage stakeholders to draft a solution to custom challenges. Will you move that forward?	3/17/2016	3/17/16 Ag Sector Mtg	The business plan proposes a simplified, low hassle customer engagement for all EE programs. This requires a collaborative examination by administrators, implementers and regulators of current program requirements to significantly reduce the customer hassle factor.
0262	Comment on SDG&E Stage 2 Industrial SC Meeting Presentation Most industrial customers have strict procurement processes. I'm not clear your proposed online bidding platform is going to be that helpful, if customers need to run the procurement process their own way. What's needed is that person-to-person push to move projects forward.	6/10/2016	5/5/16 Industrial Stage 2 Mtg Notes	See, Strategic Energy Management strategy that will continuously work with customer on EE projects.
0263	Too much of the IOU interaction with industrial customers is all about the PA process, but we have to act totally differently with the customers to bring them along.	6/10/2016	5/5/16 Industrial Stage 2 Mtg Notes	See, Strategic Energy Management and Intelligent Outreach strategies
0264	Part of the joint development work on SEM program is development of an activity tracker. Perhaps that tool or similar activity tracker could be put into use right away for existing programs to help document the work of implementation teams so that it can be provided more effectively to the ED during project reviews. ... So we need to make progress now as part of the Business Plan development process. PG&E is going in the right direction with the "book" they've developed and which aggregates all decisions into a	6/10/2016	5/5/16 Industrial Stage 2 Mtg Notes	See, Strategic Energy Management strategy. See, CPUC EE Policy Manual.

Ref.	Recommendation	Date	Source	Response
	guidance booklet.			
0265	Need to distinguish between big and small customers. Then we need to see these smaller customer through the process.	6/10/2016	5/5/16 Industrial Stage 2 Mtg Notes	See, Industrial Outreach strategy.
0293	NRDC-1 (re page 7) Unclear what differences are b/n market and economic. Explain reasons for differences. Is it all policy? Or is some of it due to programmatic design, and therefore this BP will address those programmatic issues?	10/2/2016	IN0334	
0294	NRDC-2 - (re page 11) P.11 states "SoCalGas response to each identified EM&V recommendations.....in Attachment C..." Attachment C does not provide this. Would be helpful to add the items from the evaluation that are relevant.	10/2/2016	IN0334	As a draft document, a number of items, including the EM&V references, are incomplete. Due to the number of discrete EM&V recommendations and observations about programs delivered from program year 2006 through 2015, the final EM&V business plans will referenced only those studies used during the development of the business plans.
0295	NRDC-3 - (re page 19) p.19 says that customers who overlap will get various offerings. Elaborate on how SCG anticipates that customers from other sectors will be served if overlapping. Is it a bonus for contractors to cross pollinate programs? Is there a role for the account rep? Other?	10/2/2016	IN0334	Simplified and seamless integration of program offerings is a key tactical objective. Through a coordinated Intelligent Outreach strategy, customers will be segmented based on their energy usage habits and the appropriate program offerings will be proactively offered to them using the appropriate delivery agent.

Ref.	Recommendation	Date	Source	Response
0296	<p>NRDC-4 - (re page 33) SCG’s Appendix B has great references to the legislation, etc. but for section 399.4 (c) of SB 350, the strategy column doesn’t tell me quite how this ensures LGs, CBOs, etc. would be used to implement programs. There should be clearer reference, perhaps sections could accomplish this. There should also be a reference to the section on partners and the forthcoming discussion of bidding. Alternatively, the table could include more prose.</p>	10/2/2016	IN0334	<p>As a draft document, a number of items, including the responses to legislative direction, are incomplete. A brief synopsis (or prose) on how SoCalGas proposes to respond to legislative direction will provided in the final business plan. The “Sourcing” section will address the approach to competitive solicitations including timing and programs.</p>
0316	<p>CPUC Kay Hardy - General Comment This draft industrial business plan chapter would not suffice for approval of a final business plan. It is vague and general in descriptions. It does not characterize industry segments well (small and large is not adequate). The chapter does not use potential estimates to develop goals. It does not provide the detailed type of information called for in the NRDC business plan guidance. The metrics do not relate to the problem statements. The chapter proposes new intervention strategies that are not sufficiently describe and are made generally applicable to all sizes of customer. The chapter calls for simplified program requirements and simplified processes for participants; it identifies these as both problem statements and goals. to the extent this refers to the custom review process, please note that the chapter does not address evaluation recommendations regarding project eligibility, improvement of realization rates, or program influence on customer participation, improvements in all of which are critical to lessening ex ante scrutiny. To the extent simplification refers to direct install or comprehensive direct install, the chapter does not adequately explain how these delivery</p>	10/2/2016	IN0338	

Ref.	Recommendation	Date	Source	Response
	methods will apply to industrial customers and which measures will be included. The chapter skirts around the fact that AB 802 type projects, with existing conditions baselines and NMEC M&V, applies only in SEM or to building improvement projects.			
0317	CPUC Kay Hardy #1 “Proposal compared to prior cycles” – using AMI data to target customers does not seem like a substantial comparison, especially when it seems that programs will still focus on specific technologies, etc. Recommend: Assess what worked and didn’t, taking into account prior evaluation results, and address other differences in current extended cycle.	10/2/2016	IN0338	
0318	Kay Hardy #2 missing C from NRDC guidance -- How this proposal addresses performance issues. Recommendation: this should be included in Compare	10/2/2016	IN0338	
0319	CPUC Kay Hardy #3 - “Food Service” is industrial?	10/2/2016	IN0338	
0320	CPUC Kay Hardy #4 - “recent market assessments” provide specific technologies with EE potential – (1) there is no list of measures anywhere in this chapter and it would be most helpful, and especially here; (2) if these are the MASI studies CPUC management instructed the IOUs not to use them for determining potential as they were very small in scope, were not peer reviewed and conclusions questioned by CPUC; troubling to see them referred to as the “focus” of program offerings (if reference is to MASI, as there is no citation). Recommendation: do not rely on MASI studies for potential.	10/2/2016	IN0338	
0321	CPUC Kay Hardy #5 - if this comprehensive is a “HOPPs” type program with existing condition baselines, etc. please note that this is only available in the industrial sector for building-related upgrades. The descriptions in this section are too vague to tell what SCG is proposing.	10/2/2016	IN0338	

Ref.	Recommendation	Date	Source	Response
0322	<p>CPUC Kay Hardy #6 - responses to EMV. This does not comply with NRDC guidance document and does not reference recommendations from impact evaluations or any other evaluations. It is misleading in that it says "SoCal Gas Response to each identified EMV recommendations" is in appendix C, which is just a bibliography of studies that only includes one impact evaluation and not even the most recent. Recommendation: comply with NRDC guidance document D. 4.</p>	10/2/2016	IN0338	
0323	<p>CPUC Kay Hardy #7 - Goals and sector objectives are just rewording of the same points and do not constitute either goals or objectives as they are used for performance metrics. Not sure what "tactical objectives" are supposed to be but they seem more like strategies. Recommendation: look at goals, objectives definitions for purposes of market transformation and rewrite</p>	10/2/2016	IN0338	
0324	<p>CPUC Kay Hardy #8 - Desired sector outcome. The table only rephrases the problem statement for vision and outcomes; does not identify near and mid-term outcomes; strategies are generic; sector metric is not a metric, it should quantify outcome, as should the near mid and 10 year "visions" which should be goals. See appendix A, which has numeric metrics.</p>	10/2/2016	IN0338	

Ref.	Recommendation	Date	Source	Response
0325	<p>CPUC Kay Hardy #9 - program intervention strategies: in Page 20 summary, (1) Facility energy advisor is X'd for all sizes; what is this? (2) Pay for performance is X'd for all sizes, if this is a direct install, AB802 type program it is available only for building upgrade related activities. It is not adequately described in the draft chapter. (3) Direct install is X'd for all sizes, if this refers to an AB 802 type program, only available for building improvements. (4) Comprehensive DI is not adequately described so whether it is a viable strategy cannot be determined. (5) Midstream EE equipment is unclear as to measures and delivery. PROGRAM INTERVENTION STRATEGIES: (1) Partnering: by limited partnership arrangements do you mean as legally defined? Doesn't say who this might be. (2) Data analytics – surely there are other applications besides marketing. (3) Virtual energy audits sounds very non-virtual with presentations to facility staff. Note that for industrial currently O&M and RCx savings available only through SEM or for building-related improvements. (4) Energy management technology: is this MBCx? (5) technical assistance. Is this an SEM cohort approach, one on one, or WET? (6) for SEM, please check on the descriptions, including savings analysis, recent and ongoing equipment installations, metering of large capital projects, descriptions do not correlate to my understanding of program design. (7) Pay for Performance. In industrial, ONLY AVAILABLE THROUGH SEM or for building improvements. (8) Custom Incentives -- what does this mean: "it offers a calculation method that can consider system and resource interactions to support an integrated , whole system and multi-resource management strategies" (9) Whole building: is this building- related or does it include process? (10)</p>	10/2/2016	IN0338	<p>(1) <i>Facility energy advisor is X'd for all sizes; what is this? Energy advisor may encompass the current online DSM audit to field audits to promote EE solutions that are tailored to the customer of all sizes.</i></p> <p>(2) <i>Pay for performance is X'd for all sizes, if this is a direct install, AB802 type program it is available only for building upgrade related activities. It is not adequately described in the draft chapter. P4P is not direct install. It is performance based incentives based on simplified M&V of energy efficiency savings over a multi-year period.</i></p> <p>(3) <i>Direct install is X'd for all sizes, if this refers to an AB 802 type program, only available for building improvements. It refers to standard direct install currently offered to commercial customers as part of other IOU offerings as well as a customer co-funded comprehensive direct install to capture deeper energy savings. It is expected to be directed at small to medium-sized customers, co-delivered with electric utility offering to increase cost-effectiveness and improve delivery costs.</i></p>

Ref.	Recommendation	Date	Source	Response
	<p>comprehensive direct install, need more description of this and what measures. It does not seem appropriate for process improvements. What is a “co- pay” option? CROSSCUTTING: where is WET?</p>			<p>(4) <i>Comprehensive DI is not adequately described so whether it is a viable strategy cannot be determined. See, response to Comment #3.</i></p> <p>(5) <i>Midstream EE equipment is unclear as to measures and delivery. Currently, HVAC and water heating measures (tankless water heating) may be available to the industrial customers. The program strategy allows for emerging technologies to be adopted to a midstream program intervention strategy throughout the business plan lifecycle.</i></p> <p>PROGRAM INTERVENTION STRATEGIES: (1) <i>Partnering: by limited partnership arrangements do you mean as legally defined? Doesn't say who this might be. Partnering may include other utilities, with a shared customer base, such as a co-delivered program such as Direct Install. In such cases, a co-funding contract agreement is executed among the utilities to ensure costs are born by both ratepayer funding sources. Industry Partnering is a less formal arrangement, possibly through an MOU, that leverages an industry partner (e.g., Farm Bureau,</i></p>

Ref.	Recommendation	Date	Source	Response
				<p>etc.) to promote EE program awareness, share EE best practices and create practical awareness of segment-specific emerging technologies to customer decision-makers.</p> <p><i>(2) Data analytics – surely there are other applications besides marketing. Data analytics is expected to move customer profiling from demographics to psychographics to better understand the customers daily decision-making patterns regarding energy use. This coupled with automated continuous customer segmentation will allow programs to intervene and modify customer behavior to improve the adoption of energy efficiency practices in the most efficient manner. Other applications are expected to help inform M&V practices to support such strategies as a pay-for-performance (e.g., Strategic Energy Management). SoCalGas is anxious to see third-party EE provider community offer other innovative applications to big data currently dark to the EE industry.</i></p> <p><i>(3) Virtual energy audits sounds very non-virtual</i></p>

Ref.	Recommendation	Date	Source	Response
				<p><i>with presentations to facility staff. Note that for industrial currently O&M and RCx savings available only through SEM or for building-related improvements. Current CPUC policy were developed without the experience of more sophisticated virtual energy audits. Virtual energy audits are performed remotely and can be much more cost-efficient than in-person field audits. Convincing the customer decision-makers will still require human contact but it is expected to have greater adoption levels than traditional audits as awareness of inefficient energy consumption patterns tend to quickly modify customer behavior. This is the premise for many continuous energy improvement program offerings. SoCalGas expects the CPUC policies to evolve quickly in recognizing EE savings created by such innovative approaches and encourages Energy Division to champion such endeavors.</i></p> <p><i>(4) Energy management technology: is this MBCx? The strategy is in response to AB793 (§717(3)(b) "Energy Management</i></p>

Ref.	Recommendation	Date	Source	Response
				<p>Technology” may include a product, service, or software that allows a customer to better understand and manage electricity or gas use in the customer’s home or place of business.) The offering will promote energy management technologies to better manage energy usage. The industrial sector contains many smaller facilities that may benefit from the adoption of EMTs to better managed their energy.</p> <p><i>(5) technical assistance. Is this an SEM cohort approach, one on one, or WET? This is the spectrum of technical assistance that may be needed by industrial customers. A SEM Cohort tactic is presented as an additional offering as part of the SEM program strategy.</i></p> <p><i>(6) for SEM, please check on the descriptions, including savings analysis, recent and ongoing equipment installations, metering of large capital projects, descriptions do not correlate to my understanding of program design. Various SEM program tactics proposed are based on SEM offerings outside California. SoCalGas is working with a statewide working group</i></p>

Ref.	Recommendation	Date	Source	Response
				<p>to further refine key program elements that will assist the third-party EE provider community to design a specific program in response to an upcoming SEM program solicitation.</p> <p><i>(7) Pay for Performance. In industrial, ONLY AVAILABLE THROUGH SEM or for building improvements. P4P can also be offered for many larger EE application similar to the customized incentive offering. P4P coupled with simplified M&V may move the EE industry in California back to multi-year, performance-based incentives. This offering is expected to be offered as an option to larger industrial EE projects along with the current customized offering.</i></p> <p><i>(8) Custom Incentives -- what does this mean: "it offers a calculation method that can consider system and resource interactions to support an integrated, whole system and multi-resource management strategies". Customer Incentives represents the current customized incentive offering.</i></p> <p><i>(9) Whole building: is this building- related or does it include process? Whole</i></p>

Ref.	Recommendation	Date	Source	Response
				<p>Building is directed at whole building applications.</p> <p><i>(10) comprehensive direct install, need more description of this and what measures. It does not seem appropriate for process improvements. What is a "co-pay" option? CROSSCUTTING: where is WET? See, response to Comment 3.</i></p> <p>Comprehensive Direct Install is not intended for process improvements. Much of the industrial customers have smaller facilities and don't consume natural gas as part of their industrial processes (see, Customer Landscape section in the Industrial Business Plan). From this perspective, such customers tend to consume like small commercial or residential customers.</p> <p>Comprehensive Direct Install will use ratepayer and customer funds (i.e., co-funds) to cost-effectively install more comprehensive solutions for such facilities. SoCalGas expects to co-deliver with electric utilities across all nonresidential sectors to capture a greater share of the customer economic EE potential. As for WET, a discussion regarding how</p>

Ref.	Recommendation	Date	Source	Response
				such crosscutting activities will be coordinated with the industrial sector will be included in future drafts of the business plan.
0326	<p>CPUC Kay Hardy #10 - sector metrics. 1. Think metric would better be shown as increased participation in programs by micro/small. Increased savings could be from former participants. Another metric could be increased savings from these segments. 2. No hassle participation. I do not see how the metrics relate to the desired outcome, which is a strange outcome anyway. Does simple no hassle low cost mean more direct install? If it is directed at custom project review requirements, nothing in this chapter says how SCG will address problems with program influence, realization rates or NTG issues, and improvement in this area depends on PA improvement in program delivery. 3. Do not understand “naturally adopt” does this refer to customers who do not need rebates because they have adopted EE as a business strategy? Metrics do not relate to this. 4. Says across all industry segments but the metric applies to medium and large, and it is really not a helpful metric.</p>	10/2/2016	IN0338	

Ref.	Recommendation	Date	Source	Response
0426	<p>TURN-1 (re page 5) SCG's industrial sector BP chapter focuses on on the micro/small industrial segment. TURN finds SCG's basis for focusing on the micro/small industrial segment (p. 5) confusing. SCG's industrial sector usage is dominated by a few, very large customers that consume nearly 90% of the natural gas within the industrial sector.1 63% of SCG natural gas consumed by a few, very large customers; refineries 34% of total SCG's total gas...Given the Aliso Canyon crisis (not mentioned in the BP), and other related regional energy constraints and challenges, TURN believes SCG should have a more comprehensive approach to its industrial sector. Certainly address the micro/small industrial segment, while ensuring that reasonable additional efficiency and distributed resource opportunities with the refineries, metals/minerals, and food/beverage industrial segments are not being overlooked.</p>	10/3/2016	IN0351	<p>The industrial business plan proposes to address all customer-sizes and segments across the industrial sector. Large customers will see new program offerings such as pay-for-performance and strategic energy management in attempt to capture a larger percentage of the economic EE potential. In reviewing past program participation among segments and customer sizes, SoCalGas proposes to increase participations among smaller customers and from other segments. Many of the smaller customers do not use natural gas as part of their industrial process and so many of the past industrial offerings were not compatible. New commercial-styled programs (e.g., bundled rebates for like customers, standard and comprehensive direct install) will be directed at these smaller industrial gas customers.</p>
0427	<p>TURN-2 (re page 24) TURN recommends that SCG expand its discussion of CDI to provide the rationale for turning to this approach to reach the small/medium-sized industrial sector.</p> <p>TURN recommends SCG consider PG&E's BP AG sector finance strategies for it industrial sector, including focus on project co-pays over the \$100,000 ceiling for OBF, extending OBF repayment periods</p>	10/3/2016	IN0351	<p>The CDI program strategy will include a customer co-payment requirement. The customer will be afforded the opportunity to apply on-bill financing/repayment to help offset their project cost opportunity. SCG will propose modifications to</p>

Ref.	Recommendation	Date	Source	Response
	beyond the current standard of five years up to ten, and new, lower risk financing structures for the sector as they become available.			the current OBF requirements to increase customer options in financing energy efficiency projects.
0428	TURN-3 (re page 25) TURN recommends that SCG expand its discussion of up- and mid- stream incentives to provide additional information and data as to what products are being considered at the manufacturer and/or distributor level.	10/3/2016	IN0351	At this time, tankless water heating is the primary product considered for a mid-stream distributor strategy. As other EE products become available that would increase ratepayer benefit to implement through a mid-stream market channel approach, SoCalGas will identify the product and timing for a mid-stream or upstream approach.
0429	TURN-4 (Overview) TURN's review and comment on SCG's draft industrial business plan chapter focuses on Item 2. Content-Related Review, items d-g, of the CAEECC's suggested guidance review. TURN also considered the extent to which the draft BP chapter addresses customer sector market barriers to greater participation and deeper savings through innovations and synergies via existing and possibly new customer-and market-based strategies and tactics. SCG fails to mention possible opportunities to further advance efficiency with its largest customers. TURN is concerned that proposed solutions to the small/medium segment such as comprehensive direct install may not be as productive or cost-effective as additional innovations in finance.	10/3/2016	IN0351	The business plan proposes a number of different program intervention strategies. These will be offered when there is an opportunity to capture EE potential through a most effective and efficient manner. At times, these programs may not be offered or offered to only part of targeted customer group. Commission EE policies apply both the TRC and the PAC tests at the portfolio level to estimate its cost effectiveness. It is assumed certain customer groups may not be as (or at all) cost effective relative to the overall portfolio. The proposed comprehensive direct

Ref.	Recommendation	Date	Source	Response
				install program strategy will heavily upon financing strategies to assist the customer funding their EE investments.
0430	TURN-5 (General Comment) Customer sector goals and program savings, budgets, and cost-effectiveness are forward looking. The BPs are intended to be integral to California moving the current generally flat or stagnant needle on energy efficiency. Some quantitative context to the current portfolios and programs would be very helpful. We recommend that all data on projected customer sector goals and program savings, budgets, and cost-effectiveness be given some context relative to ongoing customer sector activities and accomplishments. There needs to be some demonstration as to how the BP will advance savings and improve cost-effectiveness.	10/3/2016	IN0351	
0431	TURN-6 (General Comment) It is not clear whether projected savings are gross annual. In D.16-08-019 (atp.21), the Commission directed are turn to net goals and the development of cumulative goals for application in 2018 to support the State's SB 350 efforts. If not already included, we commend that SCG provide projected customer sector goals and program savings in net annual and net cumulative form, with the basis for net provided, and cumulative specified by the estimated average EUL by customer sector and key programs. Indicate the basis (ie end use, measures) for the estimated average EUL(s).	10/3/2016	IN0351	

Ref.	Recommendation	Date	Source	Response
0509	<p>ORA-1 (page 9, 10) Assertions of fact or policy need to be fully supported by evidence and citation, not simply opinion</p> <ul style="list-style-type: none"> o Example: assertion on p.9 that recent market assessments studies provide specific technologies with EE potential has no citation and no discussion of what those specific technologies are or their EE potential o Example: description on p.10 of industrial market trends needs to include specific citations with page numbers for each assertion that is made. The current list of general studies may or may not be relevant. 	10/3/2016	IN0359	
0510	<p>ORA-2 (re page 11, Appendix B) Discussion of applicable legislation and regulatory directives lacks discussion of the impact on the strategy and tactics in the plan</p> <ul style="list-style-type: none"> o Example: list of applicable legislation on p.11 and in Appendix B appears to have little or no relationship to the rest of the plan; not clear why any of this matters in this chapter 	10/3/2016	IN0359	
0511	<p>ORA-3 - Doesn't take advantage of insights from past evaluations and other EM&V work</p> <ul style="list-style-type: none"> o List of responses to recommendations and their influence on the BP in Appendix C is too vague; it needs to be clear how EM&V work has influenced the strategies and tactics in the plan. 	10/3/2016	IN0359	
0512	<p>ORA-4 - The Goals, objectives, should be distinct from the programs</p> <ul style="list-style-type: none"> o Plan appears to beg in from current programs as self-evidently justifiable, rather than identify distinct goals and objectives that the existing and new programs address (or do not address and should be eliminated) 	10/3/2016	IN0359	

Ref.	Recommendation	Date	Source	Response
0513	<p>ORA-5 (re page 14) Studies that are referenced should be cited accurately and use best available recent information</p> <ul style="list-style-type: none"> o Example: in discussion of market transformation on pp.14, SoCalGas cites a 1996 paper on market transformation produced under an entirely different regulatory structure but fails to cite and discuss the 2013 ED MT white paper written by some of the same authors 	10/3/2016	IN0359	<p>The current Commission market transformation policy and definition has not explicitly recognized and adopted the specific recommendation presented in the 2013 Market Transformation policy study. The references to prior studies represents foundational understanding of the application of market transformation in the energy efficiency industry. These references allow for a basic understanding of MT terms and concepts.</p>
0514	<p>ORA-6 (re page 17) Metrics do not align with the problem statement or intervention strategy</p> <ul style="list-style-type: none"> o Example: Problem statement on p.17 of EE process being complex and time consuming is not meaningfully measured by an increase in sector participation o Example: Problem statement on p.17 of industrial organizational practices not realizing the benefits of EE is not meaningfully measured by increase in EE savings from process-related projects 	10/3/2016	IN0359	
0515	<p>ORA-7 (re page 25) Solicitation philosophy is poorly developed and appears to be too prescriptive, leaving little design control in the hands of 3Ps</p> <ul style="list-style-type: none"> o Example: program delivery description on p.25 limits 3P design and delivery to the intervention strategies in the plan, which are too prescriptive: midstream EE equipment, comprehensive direct install, small industrial bundled measure, etc. These set up narrowly defined solicitations for very specific program activities which is not how we understand the Commission's intent for 3P programs. o The plan should development a 	10/3/2016	IN0359	<p>The program intervention strategies cover a very wide spectrum of potential program possibilities. The strategies provide a general framework potential ways to intervene in the market without providing specific program design requirements. This allows the EE provider community to propose a specific program design. A final competitive solicitation strategy will be</p>

Ref.	Recommendation	Date	Source	Response
	solicitation strategy, schedule, etc			provided in the final business plan.
0516	<p>ORA-8 - Absence of a budget makes it impossible to verify whether the budget aligns with strategy and plan</p> <ul style="list-style-type: none"> o The absence of any budget information makes it difficult to understand what resources SoCalGas intends to commit to the sector and whether they are sufficient/reasonable given the plan 	10/3/2016	IN0359	Budgets are driven by the EE potential for a given sector and corresponding segments over time in combination with a portfolio level cost effectiveness analysis. Due to the time required to perform such analysis, the budgets will be presented in the final business plans.
0567	<p>Notes page 26 - Co-Chair: Draft is easy to follow.</p> <ul style="list-style-type: none"> • I love tables. Every PA had a different table that should be replicated in each BP. • Draft references an appendix regarding EM&V, but I was disappointed to find only a list of EM&V studies – and they were not connected to what they are doing – as appendix. • The more you can give to us in tables and visuals that really make connections, the better. • Also, I really liked table on p. 21 regarding types of programs. I was confused if you meant generalities, but I liked descriptions. Maybe include what is new versus modified. • I would like more information describing what you intend to do for leverage. You need to tie what will happen to get leverage. • Also I also like description of what you intend to try to do with your key partners (example, p. 27 made sense). • Please make sure strategies are measurable. 	10/4/2016	Not Yet Posted	

Ref.	Recommendation	Date	Source	Response
0568	<p>Notes page 26 - • The draft chapter could be shorter.</p> <ul style="list-style-type: none"> • The list of applicable legislation is not really tied to anything. Maybe you can eliminate this list, unless you say what you want to do because of the legislation. • P. 17 has an example of a problem statement where the metric isn't really linked to the issue. • I also found description far too prescriptive. It leaves little discretion for third parties to be able to develop and propose programs. • I think the discussion about retaining customer service representatives is fine. It is probably appropriate for customer service reps to help deliver programs, but PA should say they want to use customer service reps and how they will use them. • I would like to see brighter line between implementer and administrator. 	10/4/2016	Not Yet Posted	
0569	<p>Notes page 26 - I am mostly reflecting on remarks from ad hoc discussion on September 8 that customer service reps provide valuable service in getting programs going. I want to keep this as an option. Implementers should be able to include using utility customer service reps as part of their programs, but it should be part of implementation costs of programs. I want a clear distinction between implementer and administrator. This does not conflict with tariff rules.</p>	10/4/2016	Not Yet Posted	
0570	<p>Notes page 26-27 - Implementers depend on account reps when we work with customers. We rely on account reps as long term trusted advisors for customers. Account reps are there before and after we implement our projects. Customer service reps don't want projects to disrupt customer relationships. I have a concern with using implementer budgets for customer service reps. This is not the direction we want to go. It creates a conflict.</p>	10/4/2016	Not Yet Posted	<p>Ultimately, the most important goal is for the customer to take action. Customer representatives can play a key role in motivating the customer. Similar to current program delivery, customer representatives will be part of the EE portfolio offering for key sectors and segments. The specific</p>

Ref.	Recommendation	Date	Source	Response
				budgeting and reporting requirements can appropriately implemented to allow for clear visibility of such budgets and costs.
0571	<p>Notes page 27 - Comment:</p> <ul style="list-style-type: none"> • We want an assessment of the efficacy and integration with IDER, cogen, , etc., Have you done that already? • Questions about the cost effectiveness of small and medium DI, which are not likely to be cost effective. Is that what we really need? • More coordination and collaboration on water • Interested in upstream incentives, which seems like a good idea • Clarification on how projects in the pipeline will be handled during transition. 	10/4/2016	Not Yet Posted	
0572	<p>Notes page 27 - I have a few comments on draft chapter.</p> <ul style="list-style-type: none"> • It is interesting that 30% of gas is consumed by a large percentage of customers. It would be helpful to hear assessment of potential remaining in that segment. It would be a shame to miss if largest customers have done all that they can to make it happen (public shaming or other inducement). • Proposal for standard direct install seems to go in a non-cost effective direction. Is this really needed in industrial sector? • Upstream incentives are interesting. This is really helpful and progressive and in line with Decision calling for look at new programs. • I would love to hear more about coordination of program delivery (p.19). • There is not enough discussion about gas and SoCalGas. 	10/4/2016	Not Yet Posted	

Ref.	Recommendation	Date	Source	Response
0573	Notes page 27 - • It was confusing how S-Codes are a barrier to financing. • I'm not clear on AMI data to disaggregate gas usage. • We would like to see some clarification of how existing large pipeline of project will resolve so that customers don't lose projects so that they are accused of having not participated. We don't want customers to get burned by loss of programs through transition.	10/4/2016	Not Yet Posted	

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Appendix E: Glossary of Terms & Definitions

Appendix E: Common Terms & Definitions	
Program Intervention	A deliberate effort by utilities to intervene in the market to reduce market barriers and thereby change the level of investment in (or practice of) energy efficiency. An intervention's success in reducing market barriers, therefore, hinges on whether it leads to or causes a net beneficial outcome from a societal perspective.
Program	A set of tactics offered to the customer as part of a program intervention.
Tactics	An action embodied within a program to carry out a program intervention strategy.
Sector Metric (aka, market effect metric)	Indicator of progress towards achieving desired market effect(s). For the purpose of developing EE business plans, sector metrics only reflect the PA program intervention strategies, and rely on readily available data to allow for active monitoring by PA of progress towards achieving desired market effect.
Program Intervention Metric	Indicator of progress towards achieving a desired market effect by a program intervention through monitoring of program strategy output activities. A program's theory explains why the desired market effects are expected to result from the program's output and activities.
Baseline	The minimum or starting point used to compare the metric progress to achieving stated target.
Sector Target	The quantitative goal towards which a sector metric tracks progress. Sector metrics and targets can be used with both sector-level outputs and sector-level outcomes, whichever is more useful to the PA.
Program Target	The numeric value assigned to the program metric. The numeric value assigned to the program metric. The quantitative goal towards which a program metric tracks progress. Program metrics and targets can be used with both program outputs and program outcomes, whichever is more useful to the PA.
Desired market effect	A market effect is a change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).
Problem Statement	A summary of market barriers identified within a customer sector.
Market Barriers	Those market characteristics that inhibit the natural market adoption of energy efficiency without need for market intervention. (see, set of market barrier)
Short-term	1-3 years
Mid-term	4-7 years
Long-term	8-10+ years
Market Channel	The point of entrance in the marketplace by a program. (downstream, midstream, upstream)

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Public Sector Chapter

Draft

October 18, 2016



A  Sempra Energy utility

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A. Executive Summary

Southern California Gas Company’s public customer sector represents nearly 52% of the natural gas consumed by all commercial customers, and 11% of total SoCalGas system throughput. However, 83.2% of the public sector consumption is due to electric generation and ineligible for energy efficiency programs.¹ Public customers are primarily taxpayer-funded and are often subject to executive, legislative, and other mandates. Public sector customers are generally characterized as: not profit motivated; have fixed utility budgets; require a public process on key decisions, including funding and project approval; implement on a fiscal year rather than a calendar year; and follow unique purchasing guidelines. These characteristics are unlike most commercial businesses. The public sector is defined by four segments: local government, state government, federal government, and education. These public sector segments contain many sub-segments that are broken down by agency, department, or district affiliation.

The public sector business plan includes a combination of proven and newer program strategies coupled with inventive approaches to increase participation in energy efficiency. An example is using data analytic advancements enabled by SoCalGas’ newly implemented Advanced Meter (AMI) infrastructure, where feasible, to efficiently identify customers with the greatest energy efficiency opportunities. Using data analytics and traditional outreach approaches, SoCalGas will offer an integrated set of program strategies that meet the customer’s unique energy efficiency needs. The public sector also offers a unique opportunity to capture behavioral energy savings opportunities across common facilities. Specific program strategies will be offered to the customer to permanently capture these energy savings. To encourage greater adoption of energy efficiency among all public customer segments, SoCalGas will offer a simple, low cost suite of programs that are tailored to the unique customer characteristics of the public sector.

1. Summary Tables [Pending Revised Avoided Costs]

Table A.1: Sector Forecast - Public

Program Impacts	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
MWh	TBD										
MW	TBD										
Therms	TBD										

Emissions

CO2	TBD										
PM-10	TBD										
NOx	TBD										

Cost-effectiveness TRC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

Cost-effectiveness PAC

¹ Includes cogeneration. Source: SoCalGas Customer consumption data.

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

2. Proposal Compared To Prior Cycles

In past program cycles, program portfolios were offered based on specific programs and/or technologies, and the public sector was embedded in the commercial sector. The new sectorial business plan approach is based on customer needs and expectations, within like customer groups, proactively offered in a deliberate and efficient manner in order to significantly increase the adoption of customer energy efficiency solutions among all customer types within that sector. Taking advantage of new AMI technology, customer energy usage habits can now be examined, through efficient data analytics, to identify how customers can introduce energy efficiency into the business operations. No longer are energy efficiency programs passively offered when customers decide to participate. Now customers are actively encouraged to modify energy behaviors and to invest in the right energy efficiency upgrades at the right time, based on a coordinated set of program offerings, to improve the overall efficiency of their facilities.

In addition to proven program strategies, SoCalGas will incorporate new program strategies and corresponding program tactics to arrive at a complete EE solution set for the public sector customer. The proven and new program strategies are further detailed in the Program Intervention Strategies section. The new program approaches and the proposed implementation timeframe are summarized below:

Program Strategy	Program Tactic	Implementation Timing*
Partnering		
	Industry Partnering	Near-term, mid-term
Intelligent Outreach		
	Data Analytics	Near, mid-term
	Virtual Engagement	Near, mid-term
	Energy Management Technologies	Near, mid-term
	Sharing EE Best Practices	Near-term
	Rural Outreach	Near-term
Strategic Energy Management		Near-term
Customer Incentives		
	Pay-for-Performance	Near-term
	Bundled Measures	Near-term
Direct Install		
	Comprehensive Direct Install	Near-term
Financing		
	Public Financing Assistance	Near-term

*Note: Near-term = 1-3 years; mid-term = 4-7 years; long-term = 8+ years.

3. Response To Sector Challenges

The public sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engage the public customer to capture both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

- Limited resources among many public sector customers.
- Public sector-specific mandates (e.g. public contract code, sustainability goals, and centralized energy billing practices) create competing priorities.
- Public sector customers within disadvantaged communities² are particularly impacted as demonstrated by low EE adoption levels.

Market Characterization

Public sector customers are generally characterized as: not profit-motivated; have fixed utility budgets; require a public process on key decisions, including funding and project approval; implement on a fiscal year rather than a calendar year; and follow unique purchasing guidelines. Public customers are primarily taxpayer-funded and are often subject to executive, legislative, and other mandates. All these characteristics are unlike most commercial businesses - which is public sector customers have traditionally been characterized. Other characteristics typical of public sector customers include:

- Lack of staff, resources, and limited in-house technical expertise;
- Diverse array of building types (e.g., office, jails, police stations, hospitals, maintenance facilities, and classrooms);
- Prescribed contracting requirements for vendor selection and payment (e.g., prevailing wage guidelines);
- Permanent entities with regular changes in leadership;
- Diverse communities including urban, suburban, and rural areas in varying climate zones;
- Significant level of oversight and public review;
- Unique relationship with communities served;
- Long and bureaucratic decision-making processes; and
- Providing public services can compete with other priorities including energy efficiency.

Segments and sub-segments

The SoCalGas public sector is defined by four segments: local government, state government, federal government, and education. These public sector segments are made up of many related sub-segments that are broken down by agency, department, or district affiliation (see Table A.3). Current local government³ and institutional partnerships are comprised of state government and institutions, and local governments (cities and counties). Special Districts⁴ fall into the segment that they represent

² Section 39711 of the Health and Safety Code as identified by California Environmental Protection Agency, Designation of Disadvantaged Communities Pursuant To Senate Bill 525 (De Leon), October 2014.

³ Public Housing is covered in the Residential sector business plan under multi-family housing.

⁴ Cstda.net defines special districts: Special districts are a form of local government created by a local community to meet a specific need - See more at: <http://www.cstda.net/special-districts/#sthash.VF8LRTFP.dpuf>

based on their decision-making authority. Note: private hospitals, private universities, and private water agencies are considered “commercial” customers and are covered in the commercial sector chapter.

Table A.3: Public Sector Segments and Sub-segments

Local Government	State Government	Federal Government	Education
<ul style="list-style-type: none"> •City •County •Special Districts (Water, Waste, Transportation, Fire, Police, etc.) 	<ul style="list-style-type: none"> •Correctional Facilities/Hospitals •State Agencies & Departments 	<ul style="list-style-type: none"> •Military •Hospitals •Other Agencies •Native American Tribes 	<ul style="list-style-type: none"> •K-12 (includes private) •Higher Education •California Community Colleges (CCC) •California State Universities (CSU) •University of California (UC) •UC Hospitals

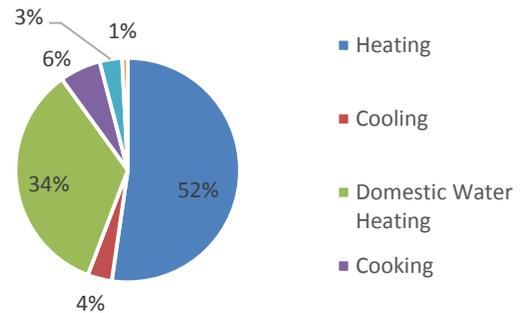
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1. Customer Landscape

a. Natural Gas Consumption

Customer Segment	2015 Number Customers	2015 Consumption (Therms)
Education	7,308	60,523,871
Local Gov't	5,515	56,598,845
State Gov't	464	19,500,366
Federal Gov't	175	8,876,932
Other		
Total	13,462	145,500,014

Figure 1.1: 2015 Public Sector Usage by End-Use



Public Sector Energy Usage

In 2015, SoCalGas public customers consumed approximately 869 million therms. The total public sector usage represents about 11% of SoCalGas' total customer load. Natural gas consumption is highest in heating in the public sector, as shown in Figure 1.1⁶.

The majority of SoCalGas public customers reside in mild climate zones, specifically coastal and valley regions. Public customer usage is weather-dependent and, as a result, is highest among inland communities (climate zones 8 and 9) with larger populations.

As shown in Figure 1.2, cogeneration load can be half or more of the total gas consumption for the customer segment (54% for Federal and 49% for Education). This consumption profile presents a traditional Energy Efficiency challenge, as cogeneration consumption does not pay into the non-Public Purpose Program and thus does not qualify for Energy Efficiency incentives and rebates in the current structure.

⁵ Not including electric generation and cogeneration

⁶ Includes only data from the Education segment, as Consumer End Use Data is not available for the remaining public sector.

Figure 1.2: 2015 Public Sector Consumption by Segment

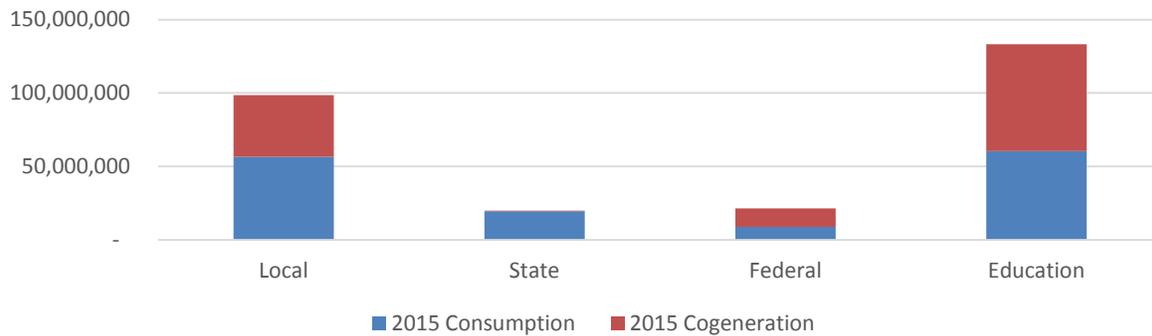
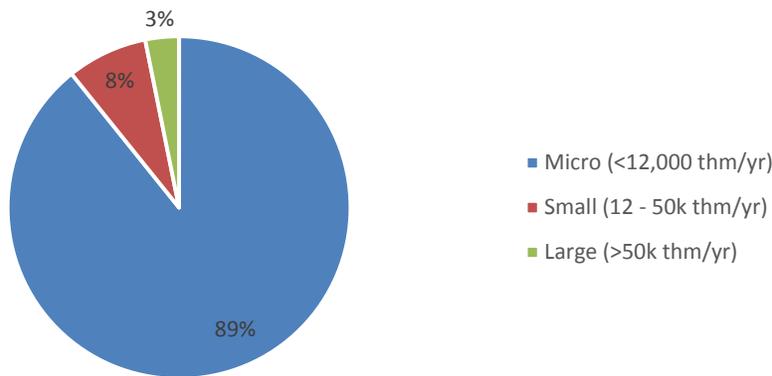


Figure 1.3: Public Sector Consumption by Sector Size



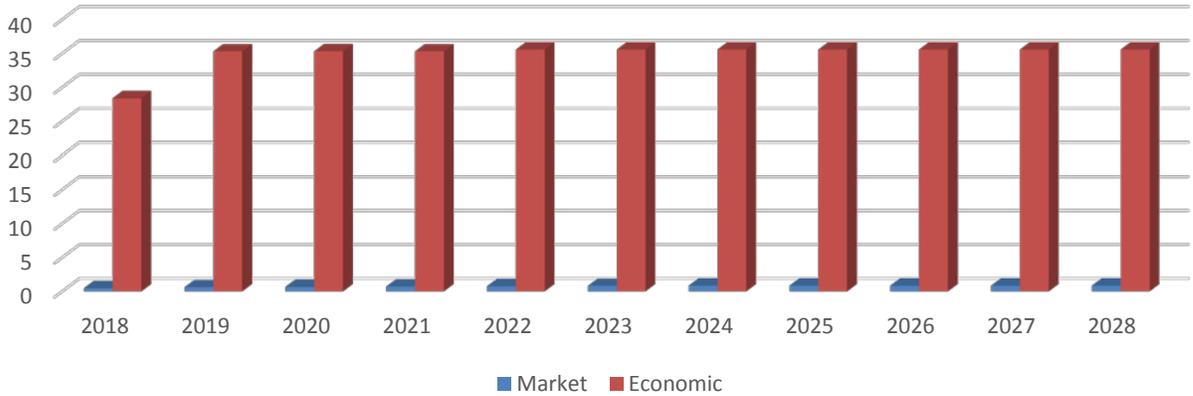
Usage By Customer Size

SoCalGas has divided its public customers into three usage categories: Micro (0-12,000 therms per year), Small (12,000 to 50,000 therms per year), and Large (more than 50,000 therms per year). Most of SoCalGas’ public customers fall into the Micro and Small categories as shown in Figure 1.3.

b. Market & Economic EE Potential

The estimated market and economic EE potential for the public sector, over the next ten years, is shown in Figure 1.4. Historically, public sector customers have been included in the commercial sector analyses (e.g., market potential studies). Consequently, the market research has not always recognized the unique characteristics of the public sector. However, the public customer usage represents about 18% of the Commercial sector. Until more specific data are available, this percentage is used as a proxy and applied to the Commercial sector market and economic EE potential to arrive at an estimated public sector EE potential. Clearly, additional data are needed to better analyze this sector, but due to the well-understood public mandates and requirements in this segment, there is little debate that where empirical data is lacking, the anecdotal evidence is clear.

Figure 1.4: EE Potential - Public - Market & Economic By Year (in MM therms)



Historical Sector Performance

Segment

The Education segment accounted for the largest portion of public sector program energy savings with 5.8 million therms saved from 2010 to 2015, as shown in Figure 1.5. Other segments that account for large portions of total savings include Local (1.7 million therms annually) and State (0.9 million therms annually).

End-Use

Figure 1.6 depicts annual energy savings of the public sector by end use. Approximately two-thirds (66%) of the energy savings are associated with HVAC, followed by 15% from Domestic Hot Water measures. The majority of public sector energy efficiency savings results were produced through the calculated program. The majority of energy savings processed through the calculated program came from equipment modernization measures, which includes measures such as equipment efficiency upgrades, variable speed drive installation, and control upgrades.

Figure 1.5: 2010-2015 Public Sector Energy Savings by Segment

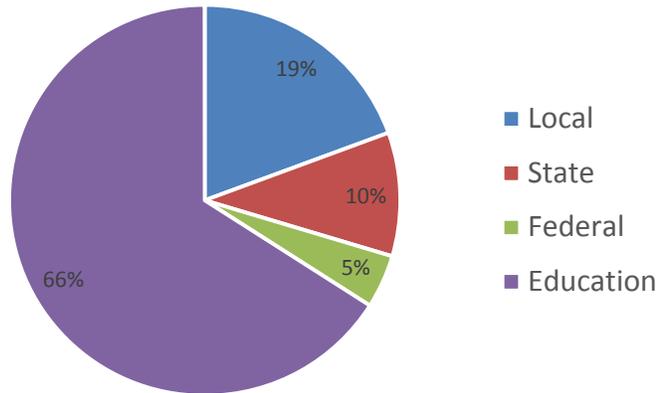
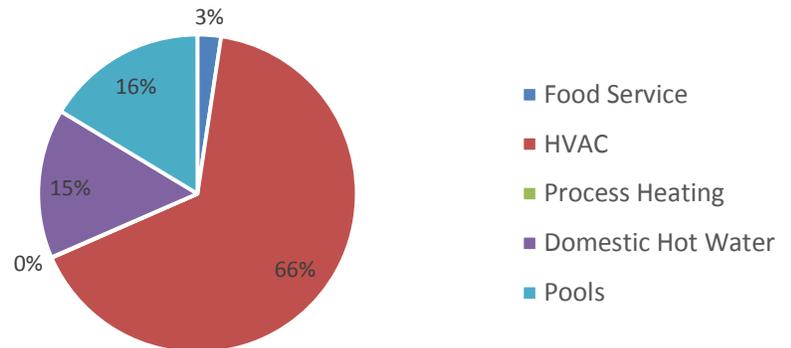


Figure 1.6: 2010 - 2015 Public Sector Energy Savings by End-Use



2. Market Intelligence

Energy Efficiency Equipment Sales Share

The public sector has common equipment used across the sector including boilers, domestic water heaters, and furnaces. Due to the unique public segment characteristics, public facilities have consistent equipment profiles, which lead to common energy usage patterns as well as similar facility designs and sizes within the segments. In order to increase the purchase of EE equipment to realize the permanent market effect, SoCalGas will place a heavy focus on increasing market adoption of EE equipment where market adoption is low.

Key Market Actors

In order to substantively increase market adoption of EE equipment in the public sector, the key market actors are the public customer leaders that can assist in transforming the market through the permanent adoption of key public policies and practices among the various government and school district levels. Additional market actors include equipment vendors and manufacturers to assist in permanently modifying equipment stocking habits as well as customer perception and acceptance of EE equipment. With unique organizational objectives of the public customer (e.g., safety and public service), partnering with various government and school district leaders and related-industry associations can lead to deeper and more comprehensive energy efficiency.

3. Industry Trends

Key trends in the public sector within SoCalGas' service territory include:

Legislative Mandates. There are several legislative mandates levied upon various public customers to promote deeper EE retrofits.

ARRA Funding. The American Recovery and Reinvestment Act of 2009 (ARRA) helped spur investments in energy efficiency solutions to customers in the public sector. There are remaining funds available to many local governments, which can empower them to invest in energy efficiency and other demand-side management solutions to better manage their energy.

Proposition 39 Funding. Energy Efficiency financing for the K-12 districts and the Community Colleges has been primarily financed by Prop 39 funding, which is slated to end in 2018. There will be a need to replace this funding to continue the efforts of upgrading these facilities.

Industry Standard Practices. The public sector by its nature is comprised of not for profit, tax revenue based entities with generally fixed operating and maintenance budgets. As shown in Figure 1.4, while the economic opportunities for energy efficiency are large, the market for them are very small. Given established maintenance budgets, absent an incentive or rebate, there is little driving customers to replace in place inefficient but working equipment.⁷ Thus, the Industry Standard Practice is perpetual maintenance, and the effective useful life for the equipment employed in the public sector needs an evaluation beyond what is established for the same equipment in the commercial sector.

⁷ Navigant Consulting, Inc., AB802 Technical Analysis Potential Savings Analysis, March 2016 page 17. [<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M159/K986/159986262.PDF>]

Clean Renewables. Public customers are choosing clean renewables without incorporating deep, comprehensive EE solutions into their renewable purchases.

Increased Tax Revenues. California has mainly recovered from the 2008 recession and is now experiencing surplus tax revenue. This creates an opportunity to direct funds to assist public customers in reducing the financial barrier to energy efficiency.

Organizational Mandates. Various public customers have instituted organizational mandates such as University of California’s carbon neutrality initiative to realize net zero greenhouse gases from its buildings by 2025. Achievement of these types of goals relies heavily upon assistance from energy efficiency programs.

K-12 School Calendar Changes. Public school districts are changing their traditional school calendars. Districts are moving the start of the school year to mid-August from the traditional September start date in order to complete the first semester within the same calendar year. Such changes will create a higher demand for cooling loads in August, and by extension, natural gas-fired electricity generation.

Recession Continues in Rural Communities. Recent economic studies project rural communities in California, especially in the San Joaquin Valley, to continue to have sluggish economies in contrast to other areas within the state.

4. Sector Influences

a. Applicable Legislation and Regulatory Directives

There are a number of newly adopted legislative bills providing specific guidance for the future of energy efficiency in California. From Senate Bill (SB) 350 to Assembly Bills (AB) 793, 758 and 802, there are numerous legislative directives that are shaping the next generation of energy efficiency programs. SB 350 sets forth a goal to double the levels of energy efficiency in California by 2030. Regulatory directives were set for by the Commission in the California Long Term Energy Efficiency Strategic Plan (CLTEESP). While there were no public sector-specific strategies identified in the original or updated CLTEESP, the commercial and local government directives were considered in the development of public sector strategies. With this goal set, a number of legislative and regulatory directives are provided to SoCalGas, and other program administrators, to help shape the energy efficiency business plans.

The CPUC has also issued guidance to program administrators on how to further formulate the energy efficiency business plans. In response, SoCalGas has reshaped existing program strategies and added new ones to meet these specific directives. A summary of the recent legislative and regulatory directives along with SoCalGas’ proposed program strategies to address these directives are detailed in Appendix B.

b. EM&V Study Recommendations & Observations

The evaluation, measurement, and verification (EM&V) process includes a limited number of public sector-related market studies, load impact, programs, process evaluations, and potential studies on energy efficiency programs and market segments.

The public sector business plan incorporates, with and without modifications, various recommendations that have not already been incorporated into the existing energy efficiency programs. A list of

referenced EM&V studies directed at the public sector is provided in Appendix C of this business plan chapter.

c. External Stakeholder Input

As part of the EE business planning process, SoCalGas received valuable input from various external stakeholders primarily through the California Energy Efficiency Coordinating Committee (CAEECC), as well as through Local Government and Institutional Partnership meetings held throughout the business planning process. The stakeholder input, in part, helped shape the program strategies offered in the business plan. Specific CAEECC recommendations and corresponding responses are shown in Appendix D of this chapter.

d. Local and State Government Partnerships

SoCalGas has 21 Local Government Partnerships and 4 Institutional Partnerships with State level government entities. These partnerships with government and other utilities (including the Los Angeles Department of Water & Power) are fruitful relationships to develop long standing Energy Efficiency projects with these customers in an ongoing basis. Additionally, SoCalGas partners with the Statewide Energy Efficiency Collaborative (SEEC) to coordinate and design large conferences on Energy Efficiency and Sustainability, and other information sharing events.

B. Vision, Goals, Objectives And Sector Strategies

The public sector vision, goals, and objectives set the tone and direction for the next generation of program offerings. It is vitally important that they are clear, concise and connected to California's overall energy efficiency vision. The public sector business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape the public sector vision. The business plan has a number of other influences, including Commission policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input, and program experience.

The public sector goals and objectives were borne from the energy efficiency business planning efforts and reflect the areas of focus needed to achieve the sector vision. In addition, sector-specific tactical objectives are provided to set clear and tangible tasks that support the sector goals and objectives. Over time, the goals and corresponding objectives may need to be reset to adapt to changes in the public sector, regulatory policies, laws, and customer response to energy efficiency program offerings.

1. Public Sector Vision

California's public sector will incorporate energy efficiency into their policies and practices thereby capturing all energy efficiency opportunities throughout their facilities.

2. Public Sector Goals

- Achieve comprehensive, deep EE levels among all facilities to support the achievement of zero net energy (ZNE) buildings.
- Incorporate EE into policies and practices to permanently modify the public customer's organizational decision-making process regarding EE retrofits.
- Increase EE levels among public sector customers in disadvantaged communities.

1. Public Sector Objectives

- Reduce the high first cost market barrier through integrated program strategies that will create a self-sustaining funding model for public sector customers.
- Permanently modify public sector EE decision-making process through energy action plans, partnering, technical assistance, sharing best practices, and other applicable program strategies.
- Increase public customer adoption of energy efficiency in rural and other disadvantaged communities through a coordinated targeting of program strategies that can reduce the unique market barriers facing customers in these communities.

2. Public Sector Tactical Objectives

- i. Simplify program requirements to facilitate ease of program participation while maintaining appropriate safeguards.
- ii. Educate public customer on energy and operational benefits and encourage customers to adopt EE equipment retrofits and behavioral changes that increase measurable energy efficiency.
- iii. Create data analytic methods to efficiently identify facilities with higher EE potential and provide tailored energy assessment to lead customer to make immediate EE behavioral changes and EE equipment purchases.
- iv. Collaborate with various public customer segments to create deep energy retrofit plans for facility retrofits and new construction opportunities, including behavioral changes.
- v. Provide data sharing for local governments, consistent with the CPUC data privacy framework, in support of mandated clean energy goals.
- vi. Collaborate with industry to identify emerging and renewed EE technologies and increase adoption levels.
- vii. Create a comprehensive outreach strategy for public customers in disadvantaged communities to increase program participation resulting in deeper EE levels.
- viii. Offer comprehensive direct install in combination with financing strategy to capture all cost-effective EE that will reduce the financial barrier to EE adoption.
- ix. Modify the on-bill financing offering to remove barriers and increase program participation.
- x. Create a Public Financing Assistance offering that empowers public customers to leverage their bill savings and other operational savings created from past EE projects to fund additional EE projects. The offering will also offer assistance to the customer to help them identify and apply for other non-ratepayer funded financing programs.
- xi. Provide awareness and assistance on a complete list of applicable financing opportunities (targeting non-ratepayer funded offerings) for various public sectors customers.

C. Program Intervention Strategies & Delivery

Since the 1990s, California has embraced the notion that energy efficiency program intervention strategies, coupled with government intervention (e.g., public policies and laws), can permanently reduce market barriers so customers can achieve higher levels of energy efficiency. In such a transformed market, customers will naturally adopt higher levels of energy efficiency without the need for program and government interventions. All programs, resource and non-resource, contribute, in

some way, to reducing market barriers in order to achieve the desired, long-lasting market effects.⁸ The current CPUC market transformation definition is:

“Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.”⁹

To determine the appropriate program strategies, the business plan identifies sector-specific problem statements with corresponding resolutions or desired outcomes. Sector-specific program strategies are identified that will reduce the current market barriers. Program delivery will rely on a combination of third party delivered statewide and local programs. These programs will be supplemented with SoCalGas support that will enable program implementers and customers to work together. The business plan also identifies key sector-level metrics that will track the progress towards achieving the desired outcomes, as presented below.

1. Problem Statements & Market Barriers

a. Problem Statements

The public sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engaged the public customer to achieve both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

1. Limited resources among many public customers.
2. Public sector-specific mandates (e.g. public contract code, sustainability goals, centralized energy billing practices) create competing priorities.
3. Public customers within disadvantaged communities are particularly impacted as demonstrated by low EE adoption levels.

b. Market Barriers

There are several market barriers present within the same market that inhibit the customer from achieving higher levels of energy efficiency. Market barriers are a byproduct of the market sector characteristics and the customer’s behavior within that specific market sector, whereas program strategies (noted later) are temporary program interventions introduced into the market sector to create real, lasting market changes. The following are perceived market barriers, specific to the public

⁸ “Market transformation is not a label that uniquely identifies certain energy efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees.” [A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel]

⁹ D.09-09-047, pp. 88-89.

sector, identified during the business planning process. Specific examples related to each market barrier are provided.

Table D.1: Perceived Market Barriers	
High First Cost	<p>Limited funding; large funding need. Large capital investments are needed to modernize existing buildings. Public funding has been unable to keep up with the projected capital investments and maintenance and repair needs.</p>
Access to Financing	<p>Financing is a challenge. Debt restrictions vary, but usually result in limited options.</p>
Misplaced incentive	<p>Organizational misplaced incentive. Budgets are zero-based; planned in “general fund” type budgets. Incentives (and bill savings) derived by EE projects typically go back to a general fund and not the department that implemented the EE project thereby not realizing the benefit for the specific customer (i.e., department.).</p>
Organizational Practices or Customs	<p>Older building stock. Many public sector buildings are of older vintage. It is costly to upgrade and often not feasible; existing EE programs have limited impacts on whole building upgrades.</p>
	<p>Organizational procurement practices. Public customers often limit their participation in effective EE programs because of existing procurement policies. Mid- and upstream measures present unique challenges to purchasing practices to these customers. K-12 schools typically procure and inventory equipment in parts (not complete pieces of equipment). Customer is hesitant with replacing whole pieces of equipment because of the stranded parts inventory that would be created. Other procurement-related matters include low-bid requirements and restrictions on accessing private financing.</p>
	<p>Competing priorities. Energy efficiency competes with many other priorities in the public sector. Public safety and services are the top priorities for this sector.</p>
Hassle or Transaction Costs	<p>Project complexity inhibits EE. EE projects are too complex and time consuming. A significant customer investment in time and effort to perform EE retrofits.</p>
	<p>Lack of technical resources. Insufficient, untrained resources to develop, implement, and maintain EE projects. One of the most important considerations for serving the public sector is the budget crisis that has afflicted public customers in recent years. In response, public customers have reduced building maintenance budgets, reduced their staffs, consolidated workers into fewer facilities, and moved out of older buildings that cost more to operate. Although some public customers in the education segment are currently leveraging Proposition (Prop) 39 to fund facility staff, this source of funding is not permanent and will likely result in further reductions when Prop 39 funds sunset.</p>
	<p>Public customers serving disadvantaged communities lack capacity. Local governments and K-12 schools in disadvantaged communities, including those in rural areas, have even less resources to pursue EE. In addition, these customers</p>

Table D.1: Perceived Market Barriers

	<p>often under-participate in programs due to distance from urban areas where most EE service providers operate.</p> <p>Prop 39 funding requirements too difficult. Requirements create lost opportunity to capture deep EE retrofits. Prop 39 only supports a small fraction of facility needs as funding requirements have made low hanging fruit measures more attractive; costlier, deep energy-saving measures have been more difficult to pursue.</p>
<p>Diffused Market¹⁰ (Lack of Information)</p>	<p>Diverse building types and diverse management decision-making processes. In a review of the government segment it was noted that: “One of the complicating factors in dealing with government customers is the diversity of building types, which range from warehouses and county clerk’s offices to laboratories and post offices. The management structures also vary across jurisdictions and from agency to agency.”¹¹</p>
<p>Performance Uncertainties</p>	<p>Behavioral energy savings are not recognized. There are several low to no-cost EE behavioral measures, including operations and maintenance (O&M) improvements, which are not recognized by current CPUC policies.</p> <p>Long Paybacks with natural gas EE projects. The very low gas usage throughout the sector, coupled with the low cost of natural gas and the high cost to retrofit older buildings make EE investments unattractive (excessively long paybacks).</p> <p>Frequent changes to EE assumptions. Public sector customer budgets are based on a fiscal year and typically cannot change once approved. In contrast, the CPUC performs more frequent updates to energy savings assumptions, which are directly linked to the incentives paid. This can cause a reduction in incentives paid, causing the customer to fund a greater portion of the EE project than originally projected. This can cause the public sector customer to have budget shortfalls (due to lower than expected paid incentives). This creates customer frustration and can result in lower participation levels.</p>

2. Desired Sector Outcome

A market effect is a permanent change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).¹² The sector business plan identifies key milestones in the advancement towards a permanent market effect through a set of desired sector outcomes. In many cases, the desired outcome is expected to occur well-beyond the near and mid-term planning horizon,

¹⁰ Diffused Market is not a yet recognized market barrier. It represents the challenges facing market actors (ESCOs, contractors, manufacturers, etc.) that offer EE solutions to a diverse market. As a result, customers are unaware EE opportunities or remain unconvinced of the associated EE benefits.

¹¹ Bryan Jungers, “Government Administration Buildings: United States; Sector Snapshot,” ESource, February 19, 2013. Accessed April 18th, 2016.

¹² A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel, p. 9

and ties to the 10-year vision for the sector. The business plan identifies the corresponding program intervention strategies that will be deployed to reduce the market barriers that will result in the desired sector outcome.

Table D.2: Problem Statement & Desired Outcome				
Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
Many public sector customers have limited resources.	Create access to self-sustaining resources to promote investment in energy efficiency.	Create permanent access to self-sustaining resources for public customers to facilitate and promote the adoption of energy efficiency solutions.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Customer Incentives • Direct Install • Financing • Midstream EE Equipment • Strategic Energy Mgmt. • Retrocommissioning • Technical Assistance 	Increase in the number of public sector customer participating in EE programs.
Public sector-specific mandates (e.g. public contract code, sustainability goals, centralized energy billing practices), create competing priorities.	Create mandates, policies, and practices that increase the priority placed on energy efficiency.	Incorporate EE into applicable energy mandates, policies, and practices to emphasize the priority of EE and support of public services.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Technical Assistance • Strategic Energy Mgmt. 	Increase in the adoption of permanent EE mandates, policies and practices.
Public customers serving disadvantaged communities are particularly impacted which is demonstrated by low EE adoption levels.	High adoption of EE by public sector customers in disadvantaged communities.	Increase EE levels among public sector customers in disadvantaged communities.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Customer Incentives • Direct Install • Midstream EE Equipment • Financing • Technical Assistance 	Increase in EE savings achieved by public sector customers in disadvantaged communities.

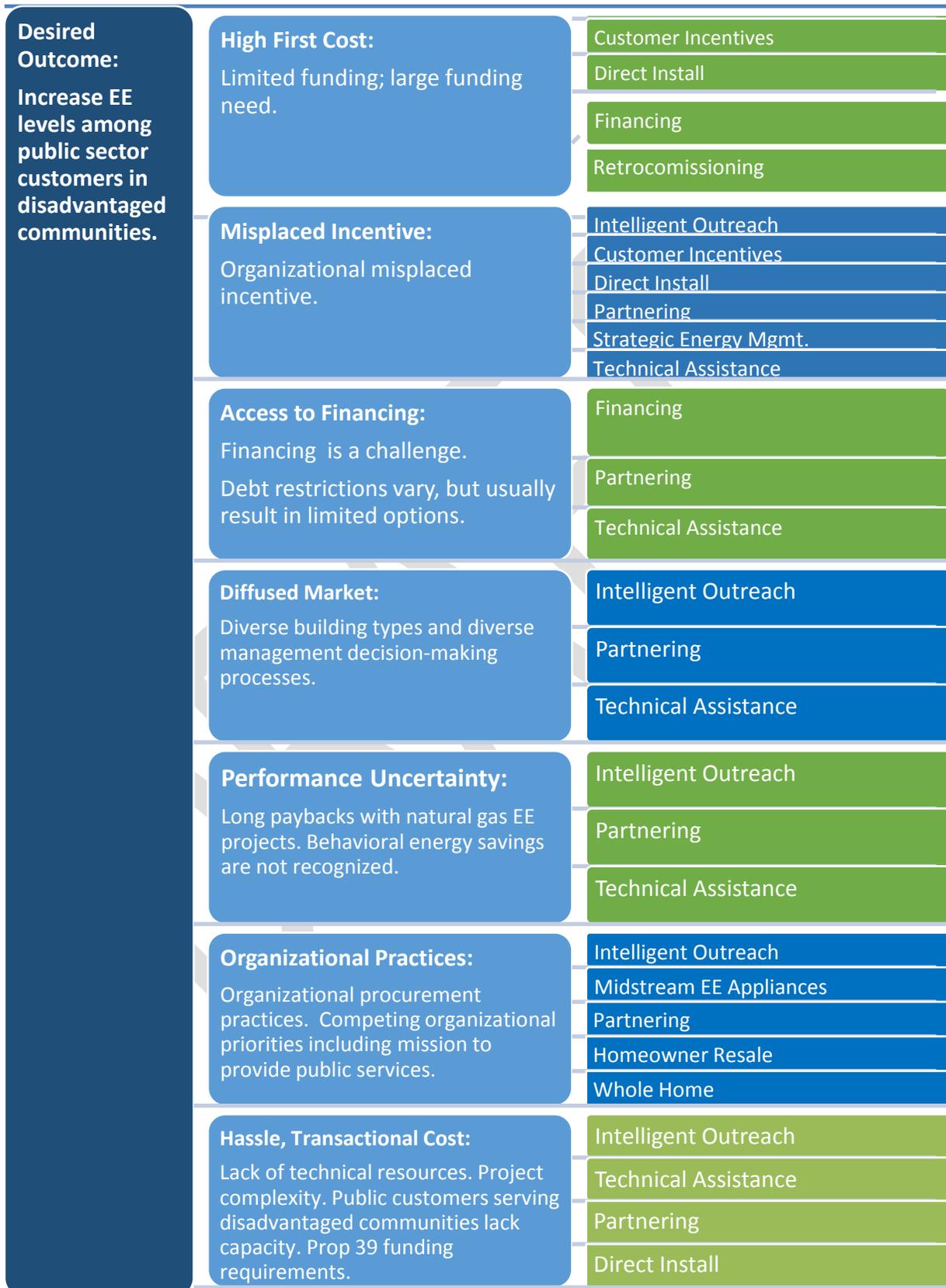
Figure 1: Market Barriers & Program Intervention Strategies



Figure 2: Market Barriers & Program Intervention Strategies



Figure 3: Market Barriers & Program Intervention Strategies



3. Program Intervention Strategies

To realize the desired sector outcomes and to increase customer EE adoption levels, several coordinated and integrated program intervention strategies will be deployed throughout the various market channels in this Sector. This integrated program strategy deployment will support the achievement of increases in the adoption of EE products and behavioral practices.

The public sector represents four unique customer segments that vary in size and type of public service. The public sector customers are primarily taxpayer-funded and are often directed by public mandates. These characteristics are unlike most commercial businesses (which is how they have traditionally been characterized within the commercial sector). In order to overcome the unique market barriers of this sector, SoCalGas will employ a variety of program strategies directed at various market channels. The program strategies respond to specific customer issues and to a recent legislative mandate to double EE levels in California by 2030. The sector approach relies on proven program strategies (e.g., deemed, calculated incentives) along with new program offerings such as pay-for-performance that provides incentives to customers based on meter energy savings and data analytics that leverage interval data to efficiently and quickly identify customer EE opportunities.

Due to the limited natural gas usage within this sector and the need to simplify customer engagement in the delivery of DSM programs, SoCalGas proposes to coordinate program delivery with local utilities (electric, water), where practicable. This will allow for a single customer engagement and will empower the customer to implement a complete energy (and water) efficiency plan.

Since public (and some private schools) customers are governed by a centralized decision-making authority, they are uniquely positioned to leverage a limited, efficient partnering strategies. There is a real opportunity to permanently transform the customer's decision-making process that will result in deeper energy efficiency and adoption of other DSM solutions. SoCalGas will leverage a partnering strategy when the opportunity will improve customer's EE adoption levels and increase the benefit to the ratepayer.

The following is a comprehensive list of program intervention strategies that will be directed at SoCalGas' public sector customers. These program strategies will be deployed in a cohesive, integrated manner throughout the duration of the business plan. Upon Commission approval of this business plan, the implementation plans that will then be developed will describe the program-specific approaches to implementing these program intervention strategies. Overall, the program intervention strategies are intended to:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services;
- Cultivate, promote and sustain lasting energy-efficient operations and practices; and
- Offer a range of simplified solutions that address the customer's energy efficiency needs.

Table D.3: Summary: Program Interventions Strategies Across Segments

Intervention Strategies	Status	Strategy Enhancements				
		Education		Local	State	Federal
		K-12	Higher	Government	Government	Government
Partnering:						
• Utility Partnering	Existing	X	X	X	X	n/a
• Industry Partnering	New	X	X	X	X	n/a
• Customer Partnerships	Existing	X	X	X	X	n/a
Intelligent Outreach:						
• Data Analytics, Benchmarking	New	X	X	X	X	
• Virtual Energy Audits	New	X	X	X	X	X
• Energy Management Technology	New	X	X	X	X	X
• Sharing EE Best Practices	Existing	X	X	X	X	
• Facility Energy Audits	Existing	X	X	X	X	X
• Rural Outreach	New	X		X		
Technical Assistance	Existing	X	X	X	X	X
Retrocommissioning/MBCx	Existing	X	X	X	X	X
Strategic Energy Management	New	X	X	X	X	X
Customer Incentives:						
• Pay-for-Performance	New	X	X	X	X	X
• Customized Incentives	Existing	X	X	X	X	X
• Deemed Incentive	Existing	X	X	X	X	X
• Bundled Measures	New	X	X	X	X	X
• Whole Building	Existing	X	X	X	X	X
Direct Install:						
• Direct Install	Existing	X	X	X	X	X
• Comprehensive DI	New	X	X	X	X	X
Financing:						
• Public On-Bill Financing	Existing	X	X	X	X	X
• Public Financing Assistance	New	X	X	X	X	X
Midstream EE Equipment	New	X	X	X	X	X
Innovative Design	Existing	X	X	X	X	
Crosscutting Coordination						
• Workforce Education & Training	Existing	X	X	X	X	X
• Codes and Standards	Existing	X	X	X	X	
• Emerging Technologies	Existing	X	X	X	X	X

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Partnering				Limited-partnership arrangements, deployed on an as needed basis that are intended to: increase the number of customers adopting energy efficiency; promote deeper, comprehensive energy efficiency; simplify customer engagement; and reduce program costs through a cost-sharing partner model based on equitably sharing of customer incentives and administrative costs among partners.
<ul style="list-style-type: none"> • Utility Partnering 	Existing	NR	Near, Mid-term	Facilitate the co-delivery of key program intervention strategies among gas and electric investor-owned utilities, publicly-owned utilities, program administrators, and water agencies.
<ul style="list-style-type: none"> • Industry Partnering 	New	NR	Near, Mid-term	Partnering will also be deployed, on an as needed-basis, among industry associations to promote EE solutions to a represented customer group.
<ul style="list-style-type: none"> • Customer Partnering 	Existing	NR	Near, Mid-term	Partnering with government and educational customers to create EE action plans as part of the customer’s sustainability plans.
Intelligent Outreach				To assist customers in identifying the greatest EE opportunities, improve cost efficiency in program delivery, segment-specific benchmarking and provide deeper, comprehensive energy savings solutions.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Data analytics 	New	NR	Near, Mid-term	<p>Leverage advanced metering infrastructure data to quickly and efficiently target facilities with the highest EE potential for customer. Data analytic techniques will be used to identify specific customers with high EE potential and/or high propensity to act. This will assist in encouraging the uninformed or uninterested customer with the opportunity for immediate and direct financial benefits by incorporating energy efficiency into their operations. Benchmarking by segment and size will be a key element to this effort.</p>
<ul style="list-style-type: none"> Virtual energy audits 	New	R	Near, Mid-term	<p>As a result of data analytics, energy audits will recommend both optimization and O&M measures to customer decision-makers and facilities staff. O&M and optimization EE opportunities will be presented to facility staff to implement for immediate and persistent energy savings along with necessary training and education to permanently change the customer's behavior. Consumer-friendly, on-going communication to inform the customer on their progress in maintaining and/or increasing EE levels within their facilities will be a permanent feature.</p>
<ul style="list-style-type: none"> Facility energy audits 	Existing	R	Near	<p>Offers onsite comprehensive assessments to identify EE opportunities and traditional data driven interactive tools designed to engage and motivate customers to reduce their energy consumption through customized program recommendations.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> • Energy management technology 	New	R	Near-term	Leverages emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and energy management technologies to permanently modify customer behavior which will result in reliable energy efficiency savings. The technologies will also serve to support utility demand response activities. These technologies will also focus on appliances that can assist the customer to manage their energy including proper equipment maintenance (e.g., HVAC self-diagnostic technology) to achieve optimal efficiency. Where practicable, the strategy will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency experience.
<ul style="list-style-type: none"> • Data sharing services 	Existing	NR	Near-term	Offering for public customers who are mandated to report progress towards sustainability goals. Data sharing will comply with Commission requirements to protect customer privacy.
<ul style="list-style-type: none"> • Sharing EE best practices 	Existing	NR	Near, mid-term	Offer, along with industry groups, a collaborative forum to help inform, excite and accelerate EE actions among like customers.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Rural Outreach Strategy 	New	NR	Near-term	<p>Target customers that serve rural communities through a coordinated outreach strategy that will promote a suite of programs offerings that are tailored to overcome unique barriers (e.g., limited contractor pool, higher financial barriers) facing rural public sector customers. The rural outreach strategy will actively engage public customers in rural and other disadvantaged communities to develop and implement a focused energy action plan that will initially target projects with the highest EE potential as well as other cost effective opportunities. The rural outreach strategy will be offered in concert with all program strategies including the intelligent outreach strategy to move customers quickly to impactful EE solutions.</p>
<p>Technical Assistance</p>	Existing	NR	Near-term	<p>The strategy will be key to creating, implementing and maintaining momentum of the customer’s energy action plan, where applicable. Technical assistance is an information strategy focused on educating and training key facility personnel on EE practices and providing supplemental technical assistance in EE project development and implementation. Assistance will be offered to aggressively obtain Prop 39 funds and other funding sources.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Retrocommissioning/MBCx	Existing	R	Near-term	Assist customers in reducing their operating costs through cost-effective energy savings, focused on the identification and implementation of low-cost / no-cost operational improvements and on optimizing how existing equipment operates as an integrated system. The strategy will rely on a combination of data analytics and metered interval data to identify O&M repair and optimization opportunities to increase energy efficiency of a facility. The strategy will typically be offered in tandem with other program strategies (e.g., Intelligent Outreach, Comprehensive direct install, etc.) to simplify customer engagement and to efficiently deliver complete EE solutions to customers.
Strategic Energy Management (SEM)	New	R	Near-term	SEM is a proven program intervention strategy achieving deeper and permanent energy efficiency levels for larger operations in the public sector through improved customer operations and maintenance practices and EE equipment installations. SEM provides long-term consulting services for educating and training participating businesses' staff to do the following: (1) develop and implement a long-term energy planning strategy; and (2) permanently integrate energy management into their business planning at all organizational levels.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
Customer Incentives		R	Near-term	<p>Facilitates customer choice by offering a simplified suite of financial incentives strategies to customers (and/or their ESCO) to reduce the high first cost barrier, the key market barrier for most customers. Although incentive-based strategies like pay-for-performance appeal to larger EE projects, in many circumstances, the deemed and customized incentive one-payment strategies are very effective in motivating the customer to install EE equipment. The following strategies will be offered in combination with other program strategies to encourage deeper, more comprehensive energy efficiency solutions and permanent EE behavior modification.</p>
<ul style="list-style-type: none"> • Pay-for-performance 	New	R	Near-term	<p>Targets more comprehensive EE projects. Customers will be encouraged to work with ESCOs, if needed, to participate in a pay-for-performance (P4P) strategy. The P4P strategy will provide for incentive payments to the participating customer over a pre-determined time period on preset payment intervals based on measured savings, using normalized meter data, with a baseline of existing conditions associated with O&M and behavioral actions and equipment retrofits.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> • Customized incentives 	Existing	R	Near-term	Offers financial incentives for customized retrofit EE projects. The program offering features incentives based on calculated energy savings for measures installed as recommended by comprehensive technical and design assistance for customized retrofits and new construction. It offers a calculation method that can consider system and resource interactions, to support an integrated, whole system, and multi-resource management strategies.
<ul style="list-style-type: none"> • Deemed incentive 	Existing	R	Near-term	Offers financial incentives based on predetermined energy savings. It also features rebates per unit measure for installed energy-saving projects and provides the IOU, equipment vendors, and customers a simple transaction and encourages greater market adoption of emerging EE technologies and applications.
<ul style="list-style-type: none"> • Bundled measure 	New	R	Near-term	Provides an integrated approach bundling various measures together to provide an all-inclusive solution to the customer based on customer profile (segment, size, energy usage) primarily for small/medium-sized customers. The bundled strategy will integrate education, financing, and technical assistance in support of the installation of EE measures.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Whole building 	Existing	R	Near-term	<p>A process that views the building as a system, rather than collection of components, in which each system interacts with each other systems such as HVAC, the building envelope, and lighting. This strategy is also directed at the new construction segment by promoting integrated design through owner incentives, design team incentives, and design assistance to participants who design spaces that are energy efficient.</p>
Direct Install				<p>Offers a standard direct install (DI) strategy targeted primarily at small/medium-sized customers that will deliver natural gas energy efficiency solutions, with electric and water efficiency, where feasible, to achieve near-term measurable results. A comprehensive direct install (CDI) offering will extend beyond the standard DI offering to achieve deeper, more comprehensive EE equipment retrofits. In coordination with a customer energy action plan, a comprehensive direct install (CDI) will extend beyond prior DI offerings that provides only a narrow and limited EE measure list. CDI is a more comprehensive strategy that relies on ratepayer funds, in part, and other funding sources, including Prop 39, district funds and/or on-bill financing. CDI will accommodate public sector procurement policy requirements such as prevailing wage requirements and leveraging in-house staff to perform work, where applicable.</p>

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Standard Direct Install 	New	R	Near-term	Typically, targets smaller customer facilities leveraging the intelligent outreach strategy that will identify facilities with the greatest EE opportunity. The standard direct install offering will provide limited list of low/no cost EE measures. DI will install natural gas EE measures along with other similar electric and water efficiency measures, where practicable.
<ul style="list-style-type: none"> Comprehensive DI 	New	R	Near-term	Encourages deeper energy savings by offering more comprehensive EE measures that are typically used by the targeted customer segment. CDI will offer qualified contractors that will engage directly with the customers to install measures. A co-pay option will be offered to the customer along with tailored on-bill repayment strategy to offset the initial cost of the EE equipment.
Public Financing				Relies upon various financing vehicles including on/off bill repayment solutions to encourage customers to adopt deeper, more comprehensive energy efficiency solutions. For many public customers, financing solutions will be encouraged to offset customer's financial contribution (e.g., co-pay) for an EE retrofit, such as comprehensive direct install, to overcome the customer's financial barriers.

Table D.4: Program Intervention Strategies

Program Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Public On-Bill Financing 	Existing	NR	Near-term	<p>In recognition of the unique characteristics in the public sector including their permanency with the communities they serve, an enhanced on-bill financing strategy will be offered to public customers to encourage deeper EE installations sooner. The public On-Bill financing strategy will enhance the standard OBF offering by extending the loan period to reduce the re-payment burden. This will allow public customers to incorporate into their plans to finance EE projects throughout their facilities. Where applicable, other financing strategies will be offered.</p>
<ul style="list-style-type: none"> Public Financing Assistance 	New	NR	Near-term, mid-term	<p>The Public Financing Assistance (PFA) strategy will be offered to public customers to encourage self-funding of EE projects and other DSM solutions including clean renewables. The PFA offering will educate customers on how to create a self-funding mechanism including training and support to assist the public customer in obtaining loan assistance from alternate funding sources. The PFA sets aside customer funds created by prior EE project rebates and bill savings into a dedicated fund within customer’s annual operating budget. These customer funds will be used in combination with other financing mechanisms (e.g., OBF) as well as other funding sources (e.g., Prop 39, bonds) to install deeper, more comprehensive EE (and other DSM) projects. This ultimately will allow the public sector to create a more self-reliant funding model.</p>

Table D.4: Program Intervention Strategies				
Program Strategy	Status	Type	Timing	Descriptions
Midstream EE Equipment	Existing	R	Near-term	Provides deemed incentives to manufactures and distributors that will be used to reduce the retail cost of natural gas EE equipment (e.g., tankless water heating). This offering will be coupled with a comprehensive, co-pay direct install strategy that can effectively deliver on-demand installation by trained and qualified contractors.
Innovative Design	Existing	R	Near-term	Will solicit for program designs to reach deeper levels of energy efficiency in various segments within the sector. The solicitations will be continuously offered through the Innovative Design for Energy Efficiency Application (IDEA365) solicitation in search of ways to capture EE savings in various segments within the sector.
Crosscutting				
Emerging Technology Introduction				Actively introduce EE technology solutions that will be applicable to the customer sector and achieve customer adoption including a focus on technologies that can be used by public sector customers.
<ul style="list-style-type: none"> Scaled Field Placement 	Existing	R	Near, Mid-term	Deliver scaled field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable customers.
<ul style="list-style-type: none"> Demonstration Field Placement 	Existing	R	Near, Mid-term	Conduct selective demonstration field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable customers.

Table D.4: Program Intervention Strategies				
Program Strategy	Status	Type	Timing	Descriptions
Codes & Standards	Existing	NR	Near, Mid-term	C&S will work with the public sector customers, especially local governments, to increase awareness of new and upcoming codes; to support for the development of new codes; and to support code compliance through training.
Workforce Education & Training	Existing	NR	Near, Mid-term	WE&T will provide classes, seminars, consultations, and demonstrations to support local government training programs for code compliance. WE&T will also assist public customers (and their staffs) by providing technical education and/or in-field training to help the public customer convert interest into EE actions. Education and training in disadvantaged communities, in coordination with the Public sector, will be a conducted.

Note: R=Resource; NR = Non-resource

4. Program Delivery

Individual programs will be designed and delivered by both third-party providers and SoCalGas based upon the program intervention strategies presented in the public sector business plan. Some programs will be designed and delivered through a statewide program implementer under contract by a lead program administrator. Other programs will be designed and delivered by third party implementers at a local or regional level. In some cases, SoCalGas will leverage its natural position with its customer to effectively deliver programs. Also, SoCalGas proposes to leverage existing resources (customer account representatives) to assist the customer and third-party program implementer in the identification and implementation of specific customer projects. During the transition to a new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market.

To enhance and to improve consistency in the administration of local government partnerships, SoCalGas, in coordination, with other program administrators will create a common partnering experience for local governments throughout California’s IOU service territories through:¹³

¹³ The details of this new local government partnership model are still being developed.

- Consistent and tiered EE incentive structures;
- Standard set of program offerings;
- Consistent eligibility requirements; and
- Common partnership arrangements.

The public sector approach will focus primarily on improving the energy efficiency of local government facilities, promoting of code compliance (AB802), pursuit of CLTEESP activities (e.g. reach codes), and outreach to the communities they serve.

a. Statewide Implementation

SoCalGas will collaborate and coordinate with other program administrators on the effective implementation of statewide program offerings. Programs designed to engage directly with specific market actors at the midstream and upstream market channels will be implemented on a statewide basis. Other downstream programs, beyond what is presented in the business plan, may also be considered candidates for statewide implementation throughout the duration of the business plan.

As directed by the Commission, various institutional partnerships (“IPs”) will be administered under a lead and consulting program administrative structure. The following IPs will be administered under this structure:

- University of California and California State University EE Partnership;
- California Community Colleges EE Partnership;
- State of California EE Partnership; and
- California Department of Corrections and Rehabilitation (CDCR) EE Partnership.

The PA’s are currently working with these statewide IP customers to determine the statewide program details. The final version of the Business Plan will provide greater detail including statewide PA lead assignments and how PAs will coordinate and consult under this new statewide structure.

b. Third-party Implementation

Local and regional solutions are necessary for the achievement of the public sector vision, goals and objectives. Many of the current programs offered in the SoCalGas region are done so in coordination with publicly-owned utilities (POUs). Such partnerships with POU’s will continue at a local level and need to be included in broader partnering efforts. For example, SoCalGas has a strong partnership with LADWP, the largest municipality in the nation, to jointly design and deliver EE programs to a shared customer base. Such activities will continue either implemented by the POU and/or implemented by SoCalGas selected and managed third-party program implementers. SoCalGas will also work with other POU’s to identify good program candidates to join the statewide implementation efforts, where feasible.

c. IOU Implementation

SoCalGas proposes to continue implementation of certain local programs to leverage its continued relationship with its customer. For example, customer representatives will actively promote energy efficiency in coordination with third-party program implementers. At times, it is more efficient and productive to leverage the natural relationship between SoCalGas and its larger customers. As the trusted energy advisor, SoCalGas’ customer representatives have an ongoing relationship with its customers on all energy matters including energy efficiency. SoCalGas proposes to continue to promote energy efficiency programs to the larger customers in order to improve the likelihood that customers will adopt energy efficiency.

5. Performance Sector Metrics

To gauge sector progress towards the achievement of the desired sector outcomes, the business plan proposes key sector metrics. To properly monitor progress, the metrics will rely on data currently collected, tracked and verified as part of the program administrator’s data requirements (e.g., energy savings, customer participation, etc.). This approach improves the accuracy and timeliness of metric tracking while keeping the monitoring costs to reasonable levels.

6. Key Partners

The success of the public sector business plan will rely on a positive, collaborative relationship with a number of market actors, program administrators, regulators and other government entities. Below is a list of key partners that will help SoCalGas successfully achieve the ambitious vision for the public sector.

Key Partners	Support Activity
Program Administrators	<ul style="list-style-type: none"> • Deliver dual-fuel programs to reach more customers; • Leverage all available best practices and promote statewide consistency, where appropriate; • Simplify program engagement; • Capture all energy efficiency benefits including operational energy savings; and • Conduct market research that will identify and better understand unique barriers to energy efficiency investments.
Publicly-owned Utilities (POUs) and Water Districts	SoCalGas will actively coordinate with POUs and water agencies to effectively and efficiently deliver energy and water efficiency programs. SoCalGas will engage in partnership and co-delivery arrangements with POUs and water agencies when there is a shared customer base (gas, electric) to simplify the customer engagement and achieve higher levels of EE. SoCalGas will actively coordinate with POUs and water agencies throughout California and other regions to share best practices in program administration, design and delivery.
Regional Energy Networks	SoCalGas will continue its collaboration and coordination with SoCalREN to offer complimentary energy efficiency program offerings through on-going, regularly scheduled meetings and conferences. This effort will ensure minimal overlap and duplication of services.
Local and State Governments	SoCalGas will leverage its existing partnerships with local and state government to assist in the development and implementation of program strategies to assist the broader local and state government public sector customers, including those who serve rural and disadvantaged communities.
State and federal agencies	SoCalGas will work with state federal agencies (e.g., DFA, DWR, USDA) to promote greater levels of EE adoption throughout the various customer segments.
Office of Statewide Health Planning and Development (OSHPOD)	SoCalGas will work with OSHPOD to incorporate EE in hospital design guidelines and for approval of Energy Efficiency retrofits.

Table D.5: Key Partners	
Key Partners	Support Activity
K-12 School Districts	Actively work with K-12 school districts to create and implement an energy efficiency retrofit plan that includes permanent behavioral changes to capture deeper EE savings.
California Public Utilities Commission and Key Stakeholders.	SoCalGas will work with the Commission and other key stakeholder to investigate ways to simplify program requirements and to identify policies that will recognize all energy efficiency benefits associated with the sector EE programs.
Third-party Program Implementers.	Solicit new and innovative programs from third-party program implementers to address the sector. Leveraging third-party programs allows program administrators to draw upon creative program solutions that can be quickly and effectively targeted to these customers. Continued collaboration with program implementers throughout the program’s lifecycle will be an integral part of the program’s success.
Rural Hard to Reach Working Group	SoCalGas will leverage its existing relationship with the Rural Hard to Reach Working group to assist in efforts with industry associations; the concept will be employed in other areas of the service territory.
Public Organizations	Public organizations can provide an effective path to sector collaboration, particularly by serving as a trusted source of information about business concerns facing specific segments. Public organizations have the ability to survey their membership to find common concerns and potential solutions. Understanding these concerns can help program administrators construct value propositions and tailor their program offerings to best serve these customers. Public organizations have an established communications channels with the public segments that can further facilitate education of public sector customers about energy efficiency programs through a variety of forums, such as social and print media, ad hoc round tables, monthly meetings, and regional or national quarterly or annual meetings. SoCalGas will collaborate with public organizations to increase program promotion and customer awareness of the benefits of energy efficiency investments.
Industry Technical Community	Specialized technical assistance with expertise in specific segments can be highly effective in identifying energy savings opportunities in facilities. The expertise can be provided by resources that include utility in-house experts, independent technical consultants, and equipment vendors.
Equipment Vendor and Manufacturers	SoCalGas will actively work with equipment vendors and manufacturers to promote greater adoption of EE equipment among the various customer segments.
California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) for financing	Financing will be a key program intervention strategy to overcome the high first cost of EE in the public sector. SoCalGas will continue its long-term collaboration with CAEATFA to design and promote innovative financing strategies that will encourage greater customer investment in EE. However, the financing for the public sector will rely mostly on an enhanced OBF offering, and engaging various “grant” opportunities.

D. Statewide Program Coordination

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and very collaborative, on-going relationship among all implementers and program administrators. A detailed discussion will be presented in the final business plan, which will include a process by which administrators will consult and collaborate among each other to ensure effective statewide implementation across all service territories.

1. Local Government Partnership Statewide Consistency

Over the last ten years, California's four IOUs have closely collaborated with local partners to make Local Government Partnership (LGP) programs operate more effectively and efficiently for customers and the communities served. This includes making program offerings, where possible, more consistent across the state. There have been a number of LGP activities that have aligned statewide over the past several years including the statewide California Long-term Energy Efficiency Strategic Plan (Strategic Plan) menu, the streamlined statewide Strategic Plan Semi-Annual Reporting template, and LGP performance management metrics. Other activities have aligned across multiple IOUs and are on their way to become consistent statewide, such as expanded direct install program offerings, and a move to regionalize partnerships .

The IOUs, however, realize that there is still much room for improvement. Over the next few years, the IOUs will work closely with local partners to drive toward greater consistency across the state, while allowing partners to retain their ability to tailor programs to their local needs.

One opportunity for improving consistency across IOUs is in regions where multiple IOUs are administering a single LGP. While all IOU's operate a model that focuses on the three pillars of municipal retrofits, strategic plan support, and core program coordination, each IOU offers its own set of LGP program guidelines resulting in some inconsistency in the delivery of energy efficiency resources within a given county or region. Moving forward, IOUs would adopt consistent program approaches within these multi-IOU partnerships. For example, is the IOUs are exploring adopting SCE's Energy Leader tiered incentive model and are also considering adopting PG&E's direct install model for LGPs. In addition to aligning programs, IOUs are considering other strategies to improve the consistency of LGP administration across multi-IOU LGPs, such as developing consistent reporting requirements, offering similar contract terms and duration, and establishing a lead IOU for each LGP to coordinate joint-program activities within a region.

The IOUs are also working on aligning statewide across Strategic Plan activities. Currently, there is a statewide menu for Strategic Plan Activities as well as a statewide template for Strategic Plan Semi-Annual Reporting. Going forward, the IOUs will look to SCE's new Strategic Plan model for opportunities to be more consistent statewide.

Supporting local governments' access to non-EE funding sources provides another opportunity for statewide consistency. The IOUs would work with the Statewide Best Practices Coordinator or another third party entity to identify and promote alternative funding sources (both internal and external to IOUs). These sources could be used to strengthen and supplement the work that local governments are already pursuing (e.g., providing broader green-house gas reduction funding). Funding opportunities

could be documented and managed in a database that will be made available to all local governments statewide. In addition, IOUs will explore leveraging LGP resources such as the SEEC Forum and All Partner meetings to provide information and support for alternative funding opportunities (such as Cap and Trade Funding, California Energy Commission Grants, Federal Grants, etc.).

As Core programs ordered to statewide implementation continue to transition, IOUs anticipate that LGPs will benefit from these changes as partnerships actively leverage these Core programs statewide, such as Commercial HVAC, Savings by Design, Primary Lighting, and Emerging Technology.

In support of continuous improvement of statewide consistency, the IOUs will utilize the CAEECC Public Sector Sub-committee on an on-going basis to discuss opportunities to improve program administration, share best practices, and provide a venue to determine whether a given solution should be adopted across the state. Other future opportunities for greater statewide consistency include contracting, Core program coordination, and transitioning partnerships to an IDSM focus.

The ultimate goal of energy efficiency market transformation programs is to drive the market to a point where the adoption of all cost-effective energy efficiency is a standard practice. To that end, over the coming years the IOUs will work closely with key stakeholders to evolve the existing partnership model to more effectively transform local governments to become self-sustaining leaders of energy efficiency. Some potential ideas may include adopting energy efficiency revolving funds, encouraging a self-funding model for energy managers, and leveraging other sources of funding. These are just a few of the potential options that would be considered by IOUs and stakeholders throughout the state as we work towards the goal of market transformation.

E. Crosscutting Sector Coordination

2. Local Marketing And Statewide Marketing, Education & Outreach Integration

The sector programs will rely on a combination of locally targeted promotion of specific energy efficiency programs tailored to the various segments throughout the sector. There will be a focus on historically underserved customers with higher EE potential, through data analytics, to encourage greater program participation.

Since the statewide Marketing, Education, and Outreach (ME&O) program's short-term goal is focused on the mass market customer (i.e., residential and small business owners) and with relatively few public sector customers compared to the overall customer base, the public sector program will rely on targeted outreach efforts to inform public customers on the importance of energy efficiency, their opportunities to act and the benefits of their actions. SoCalGas will actively participate in both the development of the five-year ME&O Strategic Roadmap and Annual Joint Consumer Action Plans to coordinate program offerings with the statewide marketing efforts and to support the short- and long-term goals of the ME&O program.

3. Workforce Education & Training Integration

The Workforce Education & Training (WE&T) effort is well positioned in its role of facilitating training on the skills needed by the workforce to perform the type, level and quality of work to reduce energy consumption and achieve the energy savings targeted by the State. WE&T will provide classes, seminars, consultations, and demonstrations to support local government training programs for code compliance. WE&T will also assist public customers (and their staffs) by providing technical education and/or in-field training to help the public customer convert interest into EE actions. Education and training will be offered in disadvantaged communities in coordination with other public sector offerings.

4. Emerging Technologies

The statewide ETP has a number of long-running partnerships with public entities that have proven to be beneficial for both sides and have moved statewide initiatives forward. Entities with whom the ETP has collaborated includes schools and universities, hospitals, water and waste water treatment facilities, military bases, and federal, state, county, and local government agencies. The ETP supports these entities by screening technologies that can be used in the implementation of Executive Order B-18-12, helping to identify energy-saving technologies that are economically viable for cash-strapped agencies, and exploring innovative new solutions for which some public buildings are uniquely positioned to adopt.

Across California, the ETP is assisting in public sector efforts to implement state initiatives. These initiatives include Executive Order B-18-12 which stipulates that state agencies reduce grid-based energy purchases by at least 20% by 2018 and incorporate building commissioning into projects to help ensure new buildings perform at maximum efficiency. The statewide ETP helps to advance these efforts by evaluating commissioning solutions and offering support for technologies that can decrease overall energy expenditures specifically in the public sector.

Taking a broader view, many public sector customers face capital constraints, particularly at the local level. For these customers, the traditional ET support for legacy efficiency programs that help remove financial obstacles to adopting energy-saving technologies is critical. As such, even as the ET portfolio diversifies over the coming years to include new and innovative types of solutions, the statewide ETP is also committed to maintaining a robust set of “traditional” measures in the ET portfolio.

Conversely, the economics of the public sector sometimes allows facilities to explore efficiency upgrades with a payback period that would be out-of-reach for cash-strapped private sector customers. For these public sector customers, ETP can offer expertise and support for pilot demonstrations. The ETP also works to accelerate the time-to-market for emerging solutions that may be too new or difficult to justify for a small business but may be a good fit for some public facilities. These sorts of activities align well with SB 350, which calls for a doubling of previous EE goals and will require adoption of innovative new solutions.

5. Codes & Standards

The Statewide Codes and Standards (C&S) Program saves energy on behalf of ratepayers by influencing standards and code-setting bodies, such as the California Energy Commission (CEC) and the Department of Energy (DOE), to strengthen EE regulations by improving compliance with existing C&S, assisting local governments to develop ordinances (reach codes) that exceed statewide minimum requirements. C&S Program will work with the public sector customers, primarily local government customers on code compliance improvement activities. The C&S effort will also draw upon local government customers into the code development in the early stages to advocate for codes and compliance-related matters. The local government customers will also receive assistance to improve their code check practices and policies as well as updating their internal systems supporting code compliance. Local governments will also be encouraged to participate in industry best practices regarding code compliance.

6. Other DSM Programs

To assist customers in managing their energy, the program strategies presented in this business plan will be coordinated and integrated with other customer demand-side opportunities, where feasible.

a. Integrated DSM

The integrated Demand-side Management (IDSM) encourages the integration of a full range of DSM options such as energy efficiency, advanced metering, low income energy efficiency, distributed generation, alternate fuel vehicles. In short, IDSM is fundamental to achieving California's strategic energy goals, as presented in the CLTEESP. IDSM efforts will continue to identify and promulgate best practices, address implementation and program policy issues across customer DSM programs. IDSM will specifically look for integration opportunities, identify integration barriers, and work with both program administrator and program implementer staffs to promote the advancement of integration, using lessons learned and best practices to establish a continuous improvement process. Although, not a program, IDSM will help other DSM programs to integrate and complement with each other to facilitate a simple, effective DSM engagement with the customer.

b. Demand Response

The public sector business plan proposes to leverage emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and energy management technologies to permanently modify customer behavior which will result in reliable energy efficiency savings and serve to support utility demand response activities. Where practicable, these efforts will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency and demand response experience.

c. Residential Rate Reform (n/a)

Natural gas residential customers are not being considered for rate reform as a result this EE business plan does not address this topic.

d. Integrated Demand Side Resources

[Pending]

e. Alternate Fuel Vehicles

The public transportation industry has undergone a major vehicle transformation over the past decade as a result of municipal agencies setting ambitious emissions reduction standards for the benefit of the communities they serve. From compressed natural gas, liquefied natural gas, biodiesel, hydrogen, and propane autogas buses, to hybrid-electric and all-electric buses, nearly 40 percent of transit vehicles across the country are running on alternative fuel vehicles according to the American Public Transportation Association.¹⁴ In California, SB 350, codified in Public Utilities Code § 740.12(a)(1), states the following goal: "Advanced clean vehicles and fuels are needed to reduce petroleum use, to meet air quality standards, to improve public health, and to achieve greenhouse gas emissions reduction goals." The public sector business plan proposes to increase awareness of alternative fuel vehicle options to serve the public transportation needs and significantly reduce NOx and GHG emissions. Consistent with SB 350's goals to address barriers to access for low-income customers to zero-emission and near-zero-emission transportation options,¹⁵ outreach efforts directed at disadvantaged communities will also emphasize the benefits and opportunities for alternate fuel vehicles supporting the public sector.

¹⁴ Transit on the Cutting Edge of Clean Technology, APTA, September 2012.

¹⁵ See SB 350 (Statutes 2015, Chapter 547), at Section 7. See CAL. PUB. UTIL. CODE §25327(d).

Additionally, local government planning for climate action plans includes elements for transportation (often creating the largest impact), where integration with EE to make both successful will be critical.

f. Energy Savings Assistance (Multifamily)

While affordable housing is sometimes done through local agencies that might otherwise be considered “government,” the basic business model nonetheless is more akin to non-government issues, so it is therefore represented in the residential sector chapter of the business plan. The component that would include the Energy Savings Assistance program as it supports the multifamily segment will be coordinated within that same business plan chapter.

F. Sourcing

Sourcing for the program intervention strategies will call upon the innovative proposals of the program implementer community and the unique market position of the utility. Specific programs will be designed and delivered in the appropriate market channel by third party implementers. The scope of the request for proposals for programs will be guided by the adopted program strategies represented in this business plan. The third party program implementer community will be called upon to propose specific program designs and delivery approaches as part of the program solicitation process. SoCalGas will collaborate with selected third party implementers to further program design to integrate with other energy efficiency programs within the portfolio and to increase the likelihood of program success.

To maintain current efficiencies and avoid customer confusion and frustration, key customer services, in support of the energy efficiency portfolio, will be maintained by SoCalGas in close coordination with the program implementer. These customer services including: customer representative to promote EE programs and program implementer customer engagement; processing customer rebate payment for downstream programs; project engineering reviews; program inspections; utility website to promote and receive customer requests for participation; and managing customer requests/complaints to SoCalGas.

Consistent with a key principle of the EE rolling portfolio to promote a healthy and vibrant EE ecosystem in California, for both large and small providers, SoCalGas will release a series of competitive solicitations, on annual basis, to allow for continuous opportunities for the EE service provider community and to encourage ongoing innovation within the program portfolio. SoCalGas plans to launch the first set of program solicitations in 2017 in expectation of Commission approval of the energy efficiency business plan application. The following provides the solicitation plan, including estimated timeline for each program solicitation and implementation, for the sector through 2020:

Program Strategy	Program Tactic	RFP Release Date	Implementation Date
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD

G. EM&V Considerations

The public sector contains four unique customer segments including: education, local government, state government and federal government. Each segment has common and unique ways they use energy. Until recently, the public sector had been included as a commercial customer. However, public customers face unique challenges independent of the private sector commercial customers. There has been limited research on the public sector and each of the four distinct segments. A deeper examination of each of the segments including those public customers who serve disadvantaged communities is needed.

The public customer can benefit greatly from permanent changes to their energy consumption practices. For instance, there are several operational changes that can have a great impact in the amount of energy consumed by public sector. Estimating the impact of behavioral measures will be paramount to the near and long-term success in achieving the overall goal of the public sector business plan.

The following are recommendations to improve the body of knowledge regarding the public sector.

Market Research and Process Evaluation:

- Conduct a market study to identify the unique segments within the public sector and to examine their unique characteristics and trends within their specific segment and sub-segment.
- Conduct market study to identify opportunities to increase EE levels for public customers serving disadvantaged communities.
- Conduct market research on zero net energy opportunities especially for the Education segment.
- An examination of local and state procurement practices to better inform what permanent changes need to occur with public procurement practices to place greater emphasis on EE.
- Survey public customers to identify where program participation process can be simplified.

Load Impact:

- Use normalized metered energy consumption data to determine the overall impact of O&M and behavior measures as an enhanced approach to quantify energy savings. For this approach, energy savings are calculated as the difference between the normalized metered energy consumption for baseline and post-intervention time periods.

Appendix A: Sector Metrics

Energy Efficiency Business Plans: Sector Metric Table - Public Sector

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
1. Many public sector customers have limited resources.	California's public sector will incorporate energy efficiency into their policies and practices thereby capturing all energy efficiency opportunities throughout their facilities.	1. Create permanent access to self-sustaining resources for public customers to facilitate and promote the adoption of energy efficiency solutions.	Partnering Intelligent Outreach Customer Incentives Direct Install Financing Midstream EE Appliances SEM RCx/MBCx Technical Assistance	Increase number of public sector customer participating in EE programs.	2015 Participation Levels.	Program tracking data.	Increase the number of program participants by 15% over 2015 levels by Year 3.	Increase the number of program participants by 35% over 2015 levels by Year 7.	Increase the number of program participants by 50% over 2015 levels by Year 10.
2. Public sector-specific mandates (e.g. public contract code, sustainability goals, centralized energy billing practices),		2. Incorporate EE into applicable energy mandates, policies, practices to emphasize the priority of EE.	Partnering Intelligent Outreach Technical Assistance SEM	Increase adoption of permanent EE mandates, policies and practices.	2015 Participation Levels.	Program tracking data.	Increase number of policies that promote EE by 5% over 2015 levels by Year 3.	Increase number of policies that promote EE by 20% over 2015 levels by Year 7.	Increase number of policies that promote EE by 50% over 2015 levels by Year 10.

Energy Efficiency Business Plans: Sector Metric Table - Public Sector

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
create competing priorities.									
3. Public customers serving disadvantaged communities are particularly impacted which is demonstrated by low EE adoption levels.		3. Increase EE levels among public sector customers in disadvantaged communities.	Partnering Intelligent Outreach Customer Incentives Direct Install Midstream EE Equipment Financing SEM RCx/MBCx Technical Assistance	Increase in EE savings from public sector customers in disadvantaged communities.	2015 Participation Levels.	Program tracking data.	Increase EE savings from public customers in disadvantaged communities by 5% over 2015 levels by Year 3.	Increase EE savings from public customers in disadvantaged communities by 15% over 2015 levels by Year 7.	Increase EE savings from public customers in disadvantaged communities by 50% over 2015 levels by Year 10.

Appendix B: Applicable Legislation and Regulatory Directives

Appendix B: Applicable Legislation	
Applicable Legislation	Program Intervention Strategies
SB 350	
§25310(c)(5) The energy efficiency savings and demand reduction reported for the purposes of achieving the targets established pursuant to paragraph (1) shall be measured taking into consideration the overall reduction in normalized metered electricity and natural gas consumption where these measurement techniques are feasible and cost effective.	P4P, SEM, Data Analytics
§25943(a)(2) The comprehensive program may include, but need not be limited to, a broad range of energy assessments, building benchmarking, energy rating, cost-effective energy efficiency improvements, public and private sector energy efficiency financing options, public outreach and education efforts, and green workforce training. **“Energy assessment” means a determination of an energy user’s energy consumption level, relative efficiency compared to other users, and opportunities to achieve greater efficiency or improve energy resource utilization.**	SEM, Data Analytics
§25943(a)(3) The CEC shall adopt, implement, and enforce a responsible contractor policy for use across all ratepayer-funded energy efficiency programs that involve installation or maintenance, or both, by building contractors to ensure that retrofits meet high-quality performance standards and reduce energy savings lost or foregone due to poor-quality workmanship.	All offerings supporting installation and maintenance
§25943(d)(5) Determine, for nonresidential structures, the availability of an appropriate cost-effective energy efficiency assessment system and whether there are a sufficient number of certified raters or auditors available to meet the program requirements.	
§399.4 (d) In updating its policies, the commission shall, at a minimum, do all of the following:	
(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.	Midstream Equipment, Intelligent Outreach, SEM, P4P
(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.	SEM, P4P
(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.	SEM, P4P
(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results.	SEM, P4P, Deemed, Calculated
AB 793	
§717(3)(b) “Energy Management Technology” may include a product, service, or software that allows a customer to better understand and manage electricity or gas use in the customer’s home or place of business.	SEM, Intelligent Outreach

Appendix B: Applicable Legislation	
Applicable Legislation	Program Intervention Strategies
AB 802	
<p>"§381.2(b) Recognizing the already underway 2015 commission work to adopt efficiency potential and goals, the Energy Commission work on its 2015 energy demand forecast, and the need to determine how to incorporate meter-based performance into determinations of goals, portfolio cost-effectiveness, and authorized budgets, the commission, in a separate or existing proceeding, shall, by September 1, 2016, authorize electrical corporations or gas corporations to provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings.</p> <p>Those programs shall include energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations, as well as operational, behavioral, and retrocommissioning activities reasonably expected to produce multiyear savings. Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission. The commission may adjust the energy efficiency goals or targets of an electrical corporation and gas corporation to reflect this change in savings estimation consistent with this subdivision and subdivision (d)." [Emphasis, added]</p>	SEM, P4P, Intelligent Outreach
<p>"(c) Effective January 1, 2016, electrical corporations and gas corporations are authorized to implement the provisions of subdivision (b) for high opportunity projects or programs. The commission shall provide expedited authorization of high opportunity projects and programs to apply the savings baseline provisions in subdivision (b).</p> <p>(d) In furtherance of subdivision (b), the commission, in consultation with the Energy Commission, shall consider all of the following:</p> <p>(1) The results of any interagency baseline assessment.</p> <p>(2) Any available results from investor-owned utility baseline pilot studies ordered in D.14-10-046.</p> <p>(3) Information necessary to ensure consistency with the energy forecast and planning functions of the Energy Commission and the Independent System Operator.</p> <p>(e) The commission may direct electrical corporations and gas corporations to make filings that are necessary to ensure coordination with the energy forecast and planning functions of the Energy Commission and the Independent System Operator."</p>	SEM, P4P
SB 1414	

Appendix B: Applicable Legislation	
Applicable Legislation	Program Intervention Strategies
<p>§399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive provides proof of permit closure and certifies that the improvement or installation has complied with any applicable permitting requirements and any specifications or requirements set forth in the California Building Standards Code (Title 24 of the California Code of Regulations), and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.</p>	<p>P4P, SEM, Calculated, Deemed</p>
<p>"(d) The commission, in a new or existing proceeding, shall review and update its policies governing energy efficiency programs funded by utility customers to facilitate achieving the targets established pursuant to subdivision (c) of Section 25310 of the Public Resources Code. In updating its policies, the commission shall, at a minimum, do all of the following:</p> <p>(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.</p> <p>(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.</p> <p>(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.</p> <p>(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results."</p>	<p>P4P, SEM, Intelligent Outreach, Calculated, Deemed</p>

Appendix B: Regulatory Directives		
Sector-specific CPUC Regulatory Directives	Cite	Response
As the strategic energy management approach leads to capture of additional savings from behavioral, retrocommissioning, and operational activities, as well as identification of bigger opportunities and tracking of projects planned by the customer, we direct the utilities to modify their continuous energy improvement programs or develop new programs to offer a robust strategic energy management program, using a statewide program design. We note in Section 4.9.2 below that strategic energy management appears to be a candidate for statewide implementation and strongly urge the utility program administrators to select this as one of the program areas that falls under this approach.	D.16-08-019, p. 42	See, Program Strategies discussion. The public sector business plan proposes a new Strategic Energy Management program strategy with key design features based on best practices from other SEM program offered in the industry. The proposed program strategy represents a coordinated statewide effort across all IOU program administrators.
Local Government Programs may be, but should not be required to be, handled in a statewide manner. We will consider LGSEC's proposal in the context of the business plans, if brought forward through the CAEECC process. Regardless of the LGSEC proposal, all business plans should also include strategies for improving the consistency of LGP administration statewide.	D.16-08-019, pp. 104-105	See, Program Delivery discussion. SoCalGas proposes to improve consistency of local government partnership administration statewide.
Program administrators shall ensure a smooth transition between existing energy efficiency program activities and the changes outlined in this decision, to be proposed in the business plans due January 15, 2017, minimizing program disruptions and avoiding any funding hiatus for ongoing efforts or partnerships.	D.16-08-019, OPN 14, p. 112	See, Program Delivery discussion. During the transition to a new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market.
As discussed above, we will require all of the upstream and midstream program delivery types to be administered according to the statewide definition adopted in this decision. These sub-programs include, but are not necessarily	D.16-08-019, pp. 62-64	See, Program Delivery discussion. SoCalGas will work with other IOUs to create a single statewide program, consistent with the CPUC's statewide definition, for the four existing Government partnerships including: <ul style="list-style-type: none"> • California Community Colleges

Appendix B: Regulatory Directives

Sector-specific CPUC Regulatory Directives	Cite	Response
<p>limited to:</p> <p>Residential</p> <ul style="list-style-type: none"> • Plug Load and Appliances Midstream • Residential Heating Ventilation and Air Conditioning (HVAC) <p>- Upstream/Midstream</p> <ul style="list-style-type: none"> • Residential New Construction <p>Commercial</p> <ul style="list-style-type: none"> • Commercial HVAC – upstream and midstream • Savings by Design <p>Lighting (even if moved to sectoral program area)</p> <ul style="list-style-type: none"> • Primary Lighting • Lighting Innovation • Lighting Market Transformation <p>Financing</p> <ul style="list-style-type: none"> • New Finance Offerings <p>Codes and Standards</p> <ul style="list-style-type: none"> • Building Codes Advocacy • Appliance Standards Advocacy <p>Emerging Technologies</p> <ul style="list-style-type: none"> • Technology Development Support • Technology Assessments • Technology Introduction Support <p>Workforce, Education, and Training Programs</p> <ul style="list-style-type: none"> • Connections <p>Government Partnerships</p> <ul style="list-style-type: none"> • California Community Colleges • UC/CSU • State of California • Department of Corrections and Rehabilitation [Emphasis added] <p>Marketing, Education, and Outreach Energy Upgrade California campaign [not part of the SW requirement]</p>		<ul style="list-style-type: none"> • UC/CSU • State of California • Department of Corrections and Rehabilitation
<p>8. All upstream and midstream programs, including but not necessarily limited to the following programs and/or subprograms from the existing portfolio, plus new programs proposed in business plans that are market transformation, upstream, or</p>	<p>D.16-08-019, OPN 8, pp. 110-111</p>	<p>See, Program Delivery discussion. SoCalGas will work with other IOUs to create a single statewide program, consistent with the CPUC’s statewide definition, for the four existing Government partnerships including:</p> <ul style="list-style-type: none"> • California Community Colleges

Appendix B: Regulatory Directives		
Sector-specific CPUC Regulatory Directives	Cite	Response
<p>midstream, shall be delivered statewide according to the definition in Ordering Paragraph 5 above: Residential: Plug Load and Appliance Midstream, Heating Ventilation and Air Conditioning (HVAC) Upstream/Midstream, New Construction; Commercial: HVAC Upstream/Midstream, Savings by Design; Lighting: Primary Lighting, Lighting Innovation, Market Transformation; Financing: New Finance Offerings; Codes and Standards: Building Codes Advocacy, Appliance Standards Advocacy; Emerging Technologies: Technology Development Support, Technology Assessments, Technology Introduction Support; Workforce, Education, and Training: Connections; Government Partnerships: California Community Colleges, University of California/California State University, State of California, Department of Corrections and Rehabilitation. [Emphasis added]</p>		<ul style="list-style-type: none"> • UC/CSU • State of California • Department of Corrections and Rehabilitation

Appendix C: EM&V Studies

CPUC EM&V Studies:

[PY2013-14 Third Party Commercial Program Value and Effectiveness Study Report \(Volume I\), dated May 2016](#)

The following are excerpts applicable to the public sector K-12 segment (emphasis added to quotes):

“For PREPPS, a gas saving program that does not directly install measures, customers indicated that implementation could **improve if the program offered a larger list of potential contractors/vendors and more information on what other districts are doing** to save energy.” P. 75

“In the case studies, we explored how many participants recalled being informed of other program opportunities while participating in the 3P program. It remains clear that 3P implementers are performing some cross-promotion, but there is an opportunity to improve on this and better inform these hard-to-reach markets if deemed appropriate. Customers stated having an interest in finding more information on how they can take advantage of additional energy saving opportunities, particularly in the school sector. **School sector customers even suggested a forum whereby school districts can exchange experiences and ideas.**” P. 46

“Lastly, **Title 24 space definitions negatively affect the school sector, as a space typically incorporates an entire campus.** In order to avoid Title 24 code, the programs can serve only a small share of a school’s area.” P. 51

“For Cool Schools, **Prop 39 caused a pause among schools.** It slowed down schools’ decision-making processes and program implementation more broadly as schools waited for that funding to become available before investing in projects. All school program staff discussed challenges with school participation in this program cycle given the release of Prop 39.” P.56

“The PREPPS program faced challenges with Prop 39 that slowed down participation as schools were waiting for funding to become available. The program was also **challenged by a disposition on pool covers that reduced claimable savings** as pool covers were one of the program’s most popular measures.” P. 56

“Initial relationship and trust building: All implementers of IDEEA 365 programs explained that relationship building is important but time-intensive. For example, **implementers of school programs highlighted that several stakeholder groups, including IOUs, program implementers, and LGPs, serve the school sector. They explained that building relationships with these stakeholders was important to obtain buy-in for the program and avoid targeting the same customers.**” P. 58

“In the **School EE program, 6 out of 10 participants indicated a willingness to pay a portion of the direct install measure cost** in the future, indicating a strong need for no-cost measures in this segment.” P. 62

“Interval data feed: Comprehensive provision of quality interval data was the main challenge to PG&E’s AERCx programs. The implementers noted that the **data provision process was difficult to navigate and that the IOUs could lay out the process more clearly.** PG&E acknowledged these issues and explained

that **the IOU does not have a team dedicated to smart meter data**, which was a major barrier to a faster and more-structured data transfer.” P. 66

“**The technical assistance helped customers identify energy efficient opportunities, select projects and measures, determine the ROI, and in some cases directly install products.** Technical assistance was provided above and beyond what was offered to the same customers through the IOU Core Commercial programs, which offered only incentives while the customer was responsible for all other aspects of the project. The programs varied slightly on what services they offered to customers, but most were a variation on the definition of technical assistance provided above. Some programs offered a set of core services to all customers, while others offered some optional services, such as assistance with finding and selecting contractors for projects. Research with participants in the 10 case study programs, which reflected the majority of the savings from 3P programs and **most of the target markets served, revealed that customers did need most of the programs’ services to adopt energy efficiency.**” Pp. 70-71

“Schools participating in the Enovity SMART program **highly needed the program’s recommendations, ROI analysis, and assistance** with the upgrades (mean importance scores between 8.0 and 8.7).” p. 71

“In the school sector, financial incentives or free measures were highly important to customers (PREPPS 7.3, School EE 9.9), highlighting the financial constraints it faces for energy efficient retrofits. Case study importance scores also show that **schools highly valued the technical assistance for retrocommissioning services** (8.0 to 8.7).” p.71

“Customers in the school sector expressed a mixed need for technical assistance. **Schools highly valued the technical assistance related to retrocommissioning (6.4–8.7), and even suggested that further assistance and training in this area would be beneficial.** However, schools that pursued retrofit measures through PREPPS or SCE’s School EE program expressed only a moderate need for technical assistance (refer to Table 16). **Based on participant feedback regarding what services they need to pursue more EE improvements, it is clear that the programs could provide more value by expanding their measure mix with more outdoor lighting (particularly for stadiums and parking lots), LEDs, and hallway lighting.**” P. 72

“The majority of 3P Commercial programs targeted hard-to-reach markets with established technologies (29 of 38). While these programs generated the bulk (93%) of combined savings (BTU) in the 2013–14 cycle, the 3P programs were also intended as a vehicle to enable more innovation. **The IOUs should seek ways by which they can encourage more-innovative program designs in 3P through its IDEA365 solicitation process. One way to do this may be to start better coordination with the Emerging Technologies Program (ETP) throughout the program solicitation process. Frequent meetings with the ETP program could begin a process whereby promising new technologies are further accelerated into the market via the 3rd party program vehicle. Annual “idea-exchange” forums could also provide an opportunity for program designers, IOUs, the CPUC and ETP staff to come together to “pitch” new program and technology ideas for consideration prior to the formal IDEA program proposal submittal process.**” P. 73

“While most customers described the program design of 3P programs as sufficient, they commonly **recommended including more eligible EE products.** Although program implementation staff described adding measures as feasible, such changes require careful review by the IOUs and CPUC to balance any changes with cost-effectiveness requirements and to limit potential overlap with other programs.” P. 73

“Customers participating in the **Enovity SMART analytics-enabled retrocommissioning program mentioned that they would benefit from additional training or assistance to troubleshoot and continue optimization post-installation.** Enovity SMART already offers 6 months of post-project monitoring and could use this monitoring service as a way to further train customers.” P. 73

“**Consider more systematic referrals to other EE programs: According to program implementation staff, about one-third (10 of 29) of the active programs did not refer their participants to other IOU programs.** The remaining implementers did not have formal referral processes, but mentioned Core programs and on-bill financing to participants or IOU Account Executives as they saw fit. Only a few also mentioned DR programs or other 3P programs. Few referrals is not surprising; implementers had little incentive to refer customers because they operated under pay-for-performance contracts and focused on participation in their own programs. To maximize energy savings from hard-to-reach customers in the commercial sector, the IOUs should therefore consider a process that supports or incentivizes referrals to other energy efficiency programs. One way to overcome this disincentive is to centralize EE program information in one statewide website that provides easy access to EE program information for commercial customers, perhaps as part of the Energy Upgrade CA statewide marketing initiative. **Another way may be to build a requirement to provide referrals to the appropriate Core programs into the contract between the IOU and implementer.**” P. 75

[California Nonresidential Program Assessments Study: Third Party Commercial Resource Program Group Report \(CPU0065.01\); Published August 23, 2013](#)

“Schools: Link free, **direct install programs to installing other measures as well;** To create more comprehensive projects, programs should install more capital intensive measures along with free or low-cost measures; Pgm should facilitate performance contracting to get at deep energy savings.” P. 17

Appendix D: External Stakeholder Observations

Appendix D: External Stakeholder Observations				
Reference	Recommendation	Date	Source	Response
0090	SCE owns over 80% of the streetlights in the WRCOG subregion. My question is simply this “How will the business plan reflect an energy savings potential of an opportunity (retrofit of streetlight, for example) that local jurisdictions do not have any control over. I	3/21/2016	PS0201	The business plan will rely on innovative approaches, such as data analytics, to efficiently and effectively identify EE potential for the customer. The plan also relies on more traditional approaches including partnering with local governments and industry groups that offer unique relationships with a particular customer group.
0091	The Rural Hard to Reach working group (RHTR) drafted recommendations for the Public Sector Business Plan (PSBP) is to provide Program Administrators (PA) specific feedback on barriers and drivers observed while serving rural. The recommendations identify three key barriers in delivering energy efficiency services to the public sector in rural areas. The PSBP must capture program design elements that support improved program delivery that addresses the key attributes of the public sector while limiting the creation of new barriers. In the short term, RHTR agrees the proposed barriers and associated drivers are applicable to the represented territories. RHTR has identified three key barriers in delivering energy efficiency services to the public sector in rural areas. The PSBP must capture program design elements that support improved program delivery that addresses the key attributes of the public sector while limiting the creation of new barriers.	3/4/2016	PS0204	RHTR recommendations are incorporated in the proposed program intervention strategies.

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	See reference documents PS0225 for recommendation			
0101	<p>K-12 Public Schools often lack the resources and expertise needed to execute efficiency projects. Schools are currently being “touched” and approached by many entities (utilities, third party programs, government partnerships, solar companies, ESCO’s, construction management companies, etc.) with overlapping or competing offerings creating confusion for school districts to know which path to take to improve facilities and spend Prop 39 funds. This leads to slower uptake of projects and slower disbursement of Prop 39 funds, and in some cases lost opportunities.</p> <p>PA’s should be considering a more streamlined approach with fewer overlapping and competing offerings and incentives to help schools navigate this complex landscape. Some of the offerings that schools will be approached with by outside entities (solar companies, ESCO’s, construction management companies) will not be something the PA’s can control, but streamlining PA offerings including partnership and third party programs will help.</p> <p>Even with streamlined programs the range of projects options available to schools will still be complex and varied. Supporting schools’ energy project planning can accelerate program participation by prioritizing efforts and ensuring budget and resources are available. Strategic Energy Management (SEM) is one type of approach that can address this need, by</p>	3/30/2016	PS0221	The business plan proposes a targeted focus on public customers that serve disadvantaged communities. The plan includes innovative program strategies (e.g., SEM) that simplify customer engagement and EE program participation while taking a holistic, long-term approach to realizing deeper, more comprehensive EE solutions for public sector customers.

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	<p>offering consultant support to assess current operations and set goals, determine the full range of potential improvements, and support the development and implementation of a multi-year energy plan. The energy plan would be comprehensive (all measure types) enabling the school district to create a long-term plan with short-term milestones. The SEM umbrella might also help in addressing the differing energy savings estimation approaches between the various programs. This strategy would strongly benefit from longer program cycles to ensure long term program success and help support longer lead time projects with small installation windows. Finally, an SEM approach over a longer term would help ensure that the value and benefits that have accrued to schools through the Prop 39 mandate are sustained beyond the end of the funding provisions and life of the Prop 39 initiative.</p>			
0102	<p>With respect to retrocommissioning programs targeting the public sector (including analytic software-enabled programs), project results have been very encouraging but overall market penetration is still very low and project throughput is often slow. In addition there is evidence that savings are being stranded by the current program/regulatory approach.</p> <p>1. Intervention strategy #1: Provide holistic support for public sector energy management & project planning. 2. Intervention Strategy #2: Collaborate with public sector and other agencies such as the Energy Commission to establish funding (such as a revolving</p>	3/30/2016	PS0222	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	<p>loan fund) to support public sector equipment repairs that are ineligible for utility program funding.</p> <p>3. Intervention Strategy #3: Workforce development initiative to train HVAC contractors to deliver operational savings to small public buildings in rural areas.</p> <p>4. Intervention Strategy #4: Provide incentives for meter installation on master-metered campuses and/or allow meter costs to be included in customers' project costs for comprehensive projects (such as RCx).</p>			
0110	<p>A) Moving Targets. Continuous rule, practice, and incentive revisions impairs the ability of Public Sector customers like UC and CSU to create strong financial proposals to successfully compete for limited funding to implement efficiency projects.</p> <p>B) Decreasing Incentive Levels. Eligible incentive dollars per project cost dollars spent have been decreasing over the last five years for higher education customers, which has decreased the volume of energy efficiency accomplishments at a time when statute requires a doubling of energy efficiency goals. These reductions have effectively forced the Universities to make their energy efficiency programs less comprehensive.</p> <p>C) Self-generation. Public Sector customers with significant self-generation (primarily cogeneration, an ARB recognized carbon reducing technology) have become ineligible for program resources due to administrative revisions to eligibility tests (annual vs. hourly). This exclusion has stranded UC and CSU campuses</p>	4/12/2016	PS0245	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	<p>with large cogeneration systems from full program participation.</p> <p>A) Moving Targets. UC and CSU recommend that during a program cycle, the base policy rules and incentive eligibility determinations remain stable for public Sector customers once a project application is approved. In addition, to the extent any workpapers are applicable, specific EUL, IMC and energy savings values should be established for Public Sector customers.</p> <p>B) Decreasing Incentive Levels. In compliance with AB 802 and SB 350, programs would transition to meter-based savings from existing conditions with incentives that are not impacted by uncertain administrative mid-stream adjustments. In addition, UC and CSU recommend that a public sector factor should be developed and applied to any remaining deemed energy savings measures implemented in the public sector to account for the higher costs of implementing construction projects in the Public Sector.</p> <p>C) Self-generation. In compliance with AB 802 and SB 350, programs would measure savings at the meter, which would provide real savings to the customer with a more straightforward accounting methodology, as opposed to limiting eligibility before a project begins based on a static baseline projection, and excluding carbon reducing and valuable preferred resources to the grid mix.</p>			

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0114	AB 802 has a data provision; can you provide input in the BPs about how the IOUs are going to provide data to the local government (CPUC process turned into performance based pilot, but not about data). For example, “Here’s where we are at automating these offerings, here is when/how folks can gain access.”	3/16/2016	3/16/16 Public Sector SC Mtg	
0115	To address the rural communities, could there be “rural adders” where companies get an added bump when they serve that community? Also need contractors who are certified to do the work well. How can we address this?	3/16/2016	3/16/16 Public Sector SC Mtg	
0128	In response to statements by the Coalition that there are major unmet needs for EE in the MUSH market, the PAs asked for data to support the statements. There do not appear to be Commission-sanctioned potential studies that address the PAs’ precise questions, because the recent potential studies have used the Title 24 and Industrial Standard Practice baselines, and so identify only a fraction of the available EE resource. Also please note that my goal in presenting this data is not to disparage or challenge the work of the PAs, whose program portfolios have been restricted within the confines imposed by Title 24. But I think we need to take a step back from those confines to see the true market potential that has been made available by AB 802.	4/27/2016	CC0247	
0165	There are major unmet needs for EE and EE funding in key MUSH market subsectors. See document PS0259 on CAEECC website for details on large gaps between various MUSH sector EE funding requirements versus funding available from PA programs,	6/1/2016	PS0259	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	historically.			
0182	Comment confirming that it would be extremely helpful for PAs to identify specific market barriers in documents that get filed with BPs with respect to challenges with MUSH markets. It is recommended that PAs make persuasive arguments to CPUC supporting continuance of certain market transforming programs even if they are not non-costs effective programs. In addition to identifying barriers, PAs should provide alternative mechanisms to remove barriers.	6/1/2016	April 20, 2016 CC Mtg	
0210	Public Sector: Business plans should articulate a vision to have this sector lead by example in every possible way. Data-driven ME&O is needed to demonstrate the benefits of efficiency to institutional decision makers. There is great opportunity to use college students and community workforce development participants in WE&T activities such as customer recruitment, project implementation, data analysis and data infrastructure development. Local and regional organizations could also play a new role as aggregators for community and institutional energy savings bid into IDSM/EE P4P auctions. Creative financing options could be piloted first with the public sector. The CEC is piloting an effort with Sonoma County to provide much better energy savings estimates for the built environment within Sonoma County's climate action planning efforts. The CEC would like to see other local governments leverage the open source data and energy reduction estimation techniques developed in this pilot. The PA business plans should include high	6/2/2016	CM028 8	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	level strategies that communicate this important connection to local government GHG reduction mandates.			
0230	<p>For all IOU PAs, (see Input Document [PS0295] for more information)</p> <p>Observations</p> <ul style="list-style-type: none"> • All IOU PAs were effective at identifying unique barriers in the Public Sector • PG&E provided detailed strategies at the sub-segment level (i.e. Higher Education), which is most effective based on the significantly different customer needs by sub-segment • No mention of statewide consistency across IOU PA approaches for the same customer or sub-segment <p>Recommended Action</p> <ul style="list-style-type: none"> • IOU PAs should coordinate strategies based on PG&E’s sub-segment approach to address varying customer needs and statewide consistency 	6/8/2016	PS0295	
0239	Give every local government or local government partnership an EE expert or pool together resources to get someone for each region	6/8/2016	May 2, 2016 Public Sector Stage 2 SC Mtg.	
0240	There were many mentions of strategies to use data for improved and informed decisionmaking, but these strategies should be outlined in the business plans. BP should highlight the strategies that address or reduce the issues of program timing, uncertainty of funding and long approval processes.	6/8/2016	May 2, 2016 Public Sector Stage 2 SC Mtg.	

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Reference	Recommendation	Date	Source	Response
0249	<p>Re SDG&E Public Sector & Statewide Public Sector. See SANDAG-1 [PS0302] Request for a Statewide Study on The Influence of Local Climate Action Plans on Energy Efficiency Program Participation. This should look at long-term influence – 5, 10, 20 years.</p> <ul style="list-style-type: none"> • Within a service territory, the local CAP implementation measures related to energy should be considered during energy efficiency program design, marketing, implementation, and performance monitoring. Specifically, energy efficiency programs should clearly demonstrate how they reduce GHGs and thereby help local governments and others in meeting CAP targets. <p>*Clear direction from the CPUC to the PAs on data-sharing at the jurisdiction/ town code level is needed.</p> <p>GHG reductions should receive equal weighting with energy savings. Energy programs now fall under implementation of state climate goals and laws but treatment of GHG reductions has not been integrated into the way energy programs are decided on at the utilities and CPUC.</p> <ul style="list-style-type: none"> • Suggestion for both the State and Utility: Progress should be made on integrating distributed energy resources with energy efficiency. Energy efficiency could be further defined as the first measure of DER. Through energy efficiency, additional onsite measures could be sized more economically (e.g., needing fewer solar panels or inverters with reduced energy usage). • Programs should either be designed to include the suite of distributed energy options under one program, or 	6/8/2016	PS0302	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	<p>have programs from energy efficiency and DER designed in tandem and become complimentary to each-other (e.g., an energy efficiency program and SGIP).</p> <ul style="list-style-type: none"> • Suggested Statewide Study: Impacts and Benefits of Expanding the Energy Efficiency Component of the PPP to address a Customer-Side Preferred Loading Order: Integrating Energy Efficiency and Distributed Energy Resource Programs under the PPP. <p>*Request for a Statewide Study: Energy Usage in Older Buildings by Service Territory. See SANDAG-4 in [PS0302]</p>			
0250	<p>This feedback relates more to Statewide suggestions for the Business Plans and Rolling Portfolio Cycle than to a specific piece of the SDG&E Public Sector Chapter. See [PS0303]</p> <p>Suggest that the Commission should allow PPP funds to be used for the top 3 measures in the Preferred Loading Order. PPP could be applied to a “preferred loading order for the customer- side of the meter.” Measures could be prioritized or mandated in order of efficiency to DER. Here again the treatment of GHG reductions along with energy savings plays a role.</p> <ol style="list-style-type: none"> 1. Energy Efficiency (including performance controls), 2. Demand Response (including performance controls), 3. Distributed Energy Resources (including performance controls). <p>Suggest that the Commission should consider integration of energy efficiency and DER funding in terms of Codes and Standards also. In 2020, the first ZNE code becomes effective.</p>	6/8/2016	PS0303	

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Reference	Recommendation	Date	Source	Response
	<p>Traditionally the PPP energy efficiency dollars have been used for code compliance, code training, and code development.</p> <ul style="list-style-type: none"> o When ZNE is code, will the PUC only allow PPP to fund the energy efficiency code component? o What will be the source of funding for the rest of the energy code? <p>See [PS0303] page 3 for three possible solutions to cost effectiveness of Transformational Programs.</p> <ul style="list-style-type: none"> o Would legislation need to be passed for the Commission to be able to direct PAs to use their PPP energy efficiency funds for energy efficiency, DR, and DER? o It seems that energy policy is coming up to a big merge rather than a fork in the road and the Commission has the opportunity to break down some silos between proceedings and subsequent silos across PA departments. <p>The Public Sector is an essential tool for driving market transformation as PAs, Implementers and users of energy efficiency programs. For a greater uptake in program participation by the public sector, the value proposition introduced to public agencies must:</p> <ol style="list-style-type: none"> 1) Speak the language of that customer and 2) Address or connect to that customer class' highest priorities. <p>SDG&E and other PAs should look at the value proposition for public sector while they are designing programs, and structure the programs around that.</p>			

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Reference	Recommendation	Date	Source	Response
0252	Re All PAs' Public Sector chapters. See RTHR-1 in [PS0305] PAs should work with stakeholders to develop a statewide framework that allows for program consistency and transparency throughout the state while allowing for localized autonomy for the PA and stakeholders.	6/10/2016	PS0305	
0253	RHTR 2 in [PS0305] Use the Societal Cost Test or the California Energy Commissions Savings to Investment (SIR) ratio as incremental steps in the right direction while exploring more robust cost-effectiveness tests that internalizes while not be limited to the following: o GHG reductions o Human health and safety gains o Reduced environmental impacts o Localized economic multipliers	6/10/2016	PS0305	
0254	RE SCE Public Sector Stage 2 doc, RHTR 3 of [PS03045] Observations • PA states increased number of reach codes as a metric for Problem Statement One. Recommended Action • PA should reconsider using increased number of reach codes as a metric. • Consideration improvement over baseline AND number of reach codes adopted would be more equitable.	6/10/2016	PS0305	
0255	Re SoCalREN page 4 and PG&E pg 13, RHTR 5 see [PS0305] Observations • PA presents staff education and training for CEM and Strategic Energy Management (SEM) to address Lack of Capacity problem statement • PA presents expanded training as a solution to lack of capacity. Recommended Action	6/10/2016	PS0305	

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Reference	Recommendation	Date	Source	Response
	<ul style="list-style-type: none"> We recommend other PAs consider this localized approach to building capacity. 			
0256	<p>Re PG&E Stage 2 Public Sector Document, RHTR6 in [PS0305] Observations</p> <ul style="list-style-type: none"> PA recommends the integration of behavioral programs as a solution to Increase the Relevancy of PG&E Portfolio <p>Recommended Action</p> <ul style="list-style-type: none"> We caution the PA in using behavior programs as a strategy under the current evaluation model. 	6/10/2016	PS0305	
0257	<p>Re SoCalGas Stage 2 WE&T doc, SJVCEO#1 in [WE0306] Observations</p> <ul style="list-style-type: none"> Education/training content does not reach underserved communities and tends to focus on the incumbent workforce. Offerings among education and training providers differ. <p>Recommended Action</p> <ul style="list-style-type: none"> We recommend that IOUs partner with Workforce Investment Boards (WIBs), business associations and community colleges to increase reach and bridge the gap between industry needs and curriculum gaps. 	6/10/2016	WE306	
0269	<p>Include \$1 million annual funding for a new partnership with Administrative Office of Courts (AOC). CA Department of General Services is not involved in ownership, operation or contracting for the AOC facilities. Include additional funding for in depth audits.</p>	10/2/2016	PS0326	

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Reference	Recommendation	Date	Source	Response
0270	Create a long-term sustainable program to help the California Administrative Office of Courts (AOC) substantially reduce its energy use. The AOC Statewide Partnership Program (AOC Partnership) would fund a team of energy professionals through the energy efficiency public purpose program to assist the AOC to plan, evaluate, and implement projects to reduce facilities' energy use. The proposed budget for the program is approximately \$1 million per year (approximately five professionals at an average fully loaded cost of \$200,000 per person). The IOUs will select the team through a competitive process and contract with it to assist the AOC in the following services:	10/2/2016	CC0331	
0290	#1 - The state is interested in more creatively exploring other options for project execution and is strongly reaching out to IOUs and other program administrators to be a partner with us in finding creative solutions. Adapting OBF to include upfront construction costs would help to enable the state to leverage this financing approach. Most of the projects in large state buildings exceed the current \$1M limit for financing via OBF. Increasing this limit would address another barrier.	10/2/2016	PS0332	
0291	#2 - There is a need to more strategically identify the retrofit opportunities with the highest and most comprehensive savings potential long term. Implementing investment grade audits for all buildings would be cost prohibitive. The state is seeking support from IOUs and PAs to provide this strategic targeting support.	10/2/2016	PS0332	

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Reference	Recommendation	Date	Source	Response
0292	<p>#3 - It is critical that the state utilizes a fair, appropriate, transparent, competitive process in soliciting work. Given those parameters, the state is seeking support in executing retrofit projects that comply with these requirements while offering more time saving and efficient approaches.</p> <p>--The state is exploring alternative models for engaging with ESCOS more effectively, at lower costs and more timely execution. The Federal Government has effectively modeled an energy services relationship with the IOUs that may be modified to work with State entities. We encourage the Partnership to work with us to develop alternative ways of delivering efficiency projects to state customers</p> <p>--The state is open to piloting metered based savings approaches with incentives tied to measured savings</p> <p>--Extending the current direct install program to small/medium state facilities statewide would help to save time and resources. Further expanding the direct install program to include HVAC measures and control measures would capture a larger portion of the current needs.</p>	10/2/2016	PS0332	
0301	<p>NRDC-1 - (throughout) There seems to be a lot of extra prose. The definitions are extremely helpful, but seems that it could be an Appendix instead of as part of the actual BP.</p>	10/2/2016	PS0336	
0302	<p>NRDC-2 - (re beginning of document) Very little market characterization. It's unclear what the main end uses are, where the highest need is, etc. It is understandable that there isn't sufficient "public" data but there were examples in the Phase 1 presentations (e.g., SDG&E's is a good model). See</p>	10/2/2016	PS0336	

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Reference	Recommendation	Date	Source	Response
	data recommendations in “NRDC Feedback for All PAs” (Input Source Document)			
0303	NRDC-3 - (page 28-29 as an example of throughout) It’s a bit challenging to clearly see the link between barrier/strategy/etc. With so many pages of text to be read by ED and stakeholders, the PAs should strive to make the information as easily digestible and succinct as possible. See “NRDC Feedback for All PAs” for helpful table formats	10/2/2016	PS0336	
0304	NRDC-4 - (re Throughout and p.34 as an example) It’s unclear what exactly SCE proposes to do with the various intervention strategies. In table 6, there is a list of generic intervention strategies. However, this doesn’t inform the reader of what approaches are being considered to solve the barrier or reach the desired sector outcome. NRDC urges SCE to look at the other chapters and comments to add appropriate level of detail.	10/2/2016	PS0336	
0305	NRDC-5 - P.34 – missing “baseline” as a column. The “metric source” seems to be what the baseline should be. · P.36 – NRDC is “natural” not “national” · p.45 – is EAP intended to be ESAP (Energy Savings Assistance Program) or a more general term?	10/2/2016	PS0336	
0327	#2 - (re page 3) Sector profile should be simplified and made more useful by relying less on mentions of recent legislation. Section should come after a useful disclosure that catalogues all actors, sub-sectors, and primary EE funding categories.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0328	#3 (Re page 5-6) Section should be edited for brevity and should follow a new section that would include a a useful disclosure that catalogues all actors, sub-sectors, and primary EE funding categories. Digressions such as a scale issue could go into an appendix. Table 2 would work better as a Venn Diagram since UC/CSU are state agencies and K-12 is a local govt animal.	10/2/2016	PS0339	
0329	#4 (re page 10) Sector should be edited to focus on Strategic Plan framework and renamed. Remainder could go into an appendix. Should follow a new section that would include a a useful disclosure that catalogues all actors, sub-sectors, and primary EE funding categories.	10/2/2016	PS0339	
0330	#5 (re page 14) Move LGP description to a new opening section that fully describes actors and agencies SCE is targeting in public sector. Change “promote three categories” to “advance six goals”. Add capacity building and constant improvement; peer to peer knowledge transfer; and informing the CPUC, CEC, and other state agencies of on-the-ground conditions.	10/2/2016	PS0339	
0331	#6 (re page 12) MarketTrends.This section is useful but in places speaks to and generalizes LGPs rather than the public sector as a whole.(e.g.,the statement “The main market drivers for public sector EE adoption are greenhouse gas (GHG) reduction and climate action plans.” Holds true for LGPs but not for K-12, etc.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0332	#7 (re page 14) EM&V section should disclose that the IOUs have no plans and framework in place to evaluate state institutional partnerships (SIPs) or K-12. This includes no active PCG to address these segments. EM&V section should address long-term goals of IOUs LGP EM&V, including a plan to assign IOU staff with LGP knowledge , PM capability, and ample bandwidth to oversee consultant studies. This section should concentrate on the way things are, deficiencies in EMV, and what SCE intends to do to address. Much of the narrative here could go to the beginning in a new Overview chapter that profiles the public sector.	10/2/2016	PS0339	
0333	#8 - (re page 16-20) Market Barriers. Good info but needs to be refocused. Please move the PACE info from Market Trends to fit with the financing narrative here. Bulets on pp. 17-20 are needlessly repeated. Convert into a table for simplicity and transparency.	10/2/2016	PS0339	
0334	#9 - (re page 21) Omit the definitions here to consolidate and add a table to the overall BP filing – many of these defns will be applicable for various BP chapters.	10/2/2016	PS0339	
0335	#10 (re page 22) “For example, local government customers require community data for climate action plans and GHG inventories, but access to this data is limited by CPUC Decision D.14-05-016.” This statement is a pretty general disclaimer. Did SCE support this rule as proposed? Is it working out? Has there been any demonstrated benefit? Have parties complained? Does SCE support a second look at this rule? Please explain how SCE intends to navigate this rule or improve matters going forward.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0336	#11 (re page 22) “While this business plan will not be able to overcome all of the data barriers facing this sector, SCE will continue to be mindful of these challenges when developing programs, policies, and procedures.” SCE should provide at least one proposed solution to the LG data sharing impasse.	10/2/2016	PS0339	
0337	# (NA) (re page 23) “Southern California Edison's vision for the public sector is to increase customer adoption of EE improvements, enhance customers' abilities to self-serve, increase customer satisfaction, and make program participation easier for customers.” SCE should specify who the customer is in this case.SCE statement is rather generic and seemingly could be substituted for other sectors.	10/2/2016	PS0339	
0338	#12 (re page 23) Savings goals should be broken down by LGP, SIP, and K-12.	10/2/2016	PS0339	
0339	#13 (re page 23) “The public sector is a newly defined sector, which will require conducting a number of M&V studies and performance analyses as outlined below.” ED staff doesn’t gauge why a newly defined sector would require a special study. In any case, if SCE believes that EMV is an urgent priority for the public sector, it’s advised to heed ED direction for EM&V (p.27) and retain qualified IOU staff to oversee and monitor.	10/2/2016	PS0339	
0340	#14 (re page 23) Sector Vision. First two paragraphs add nothing new and should be deleted. SCE offers an interesting idea of weening LGs off of EE ratepayer funds but offers no plan to get there and no argument that this is the correct course of action. “In 10 years, SCE would like the public sector to be leaders in energy efficiency	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
	adoption and promotion. With the exception of complex or novel projects, public sector customers should no longer be reliant on utility incentives to develop and implement energy efficiency projects, and should be able to finance their own EE projects and/or leverage utility finance programs.”			
0341	#15 (re page 24) Revise for clarity “Public sector customers should continue to leverage their community respect and authority to continue to promote higher EE standards,” substituting “To further drive EE in their communities, public agencies should continue to apply their unique position as trusted and authoritative entities.”	10/2/2016	PS0339	
0342	#16 (re page 25) This sentence is confusing and appears to pardon SCE of fully describing what is in the public sector. Please delete and add more detail about the public sector entities. “The flagship public sector offerings are local government and institutional EE partnerships”	10/2/2016	PS0339	
0343	#17 (re page 25) SCE refers to “four statewide Institutional Partnerships (IPs)” which is incorrect in that these are not statewide programs. Please referenc throughout as State Institutional Partnerships (SIPs). Narrative that describes the LGPs and other programs should be moved to into Overview chapter.	10/2/2016	PS0339	
0344	#18 (re page 25) Screen entire chapter for repeated narrative. This sentence appears here for at least the third time “One of the major challenges for public sector customers is the ability to finance EE measures”	10/2/2016	PS0339	
0345	#19 (re page 25) 1. Existing Products and Services. This information should be	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
	moved to the front of the chapter.			
0346	#20 (re page 28 , 48) Please add to the following statement to explain how the proposed SCE budget will allow for sufficient generation of new innovative project ideas by LGPs. Also please reconcile the SCE budget line item LGP Strategic Plan pilots with the absence of a mention here. Is SCE pursuing new LGP Strategic Plan pilots? Why or why not and why is this justified? “In addition, LGPs have completed less complex Strategic Plan tasks through their partnership budgets. Lessons learned from the work accomplished to date have helped develop a new Strategic Plan process. In this new process, SCE has worked with Energy Division staff to develop a framework for innovative Strategic Plan activities to be proposed by local governments.”	10/2/2016	PS0339	
0347	#21 (re page 29) Everything presented here appears to be repeated elsewhere in chapter. Revise for brevity.	10/2/2016	PS0339	
0348	#22 (re page 32, 40, 48) Suggest changing decision makers to “gatekeepers”. Decision makers are elected or appointed officials not city staff, typically. If decision makers is used, come up with a definition to use consistently and appropriately.	10/2/2016	PS0339	
0349	#23 (re page 39) First mention of RENs should be much closer to beginning of chapter. CCA coordination and response also needs to be addressed.	10/2/2016	PS0339	
0350	#24 (re page 38-47) These pages don’t offer a whole lot of useful new substance should be shortened to fit in a single page.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0351	#25 (repage 47) Language is repeated verbatim from p. 27. Revise per request above and consolidate EMV discussion into one section within chapter. “The public sector is a newly defined sector, which will require conducting a number of M&V studies and performance analyses as outlined below.” ED staff doesn’t gauge why a newly defined sector would require a special study. In any case, if SCE believes that EMV is an urgent priority for the public sector, it’s advised to heed ED direction for EM&V (p.27) and retain qualified IOU staff to oversee and monitor.	10/2/2016	PS0339	
0352	CPUC/CLN-1 - (re page 7) Please be clear about extent to which health care belongs in a profile of public buildings, vs. (private) commercial, or both.	10/2/2016	PS0339	
0353	CPUC/CLN-2 - (re page 13, top) Refers to public sector climate action plans. Many of these target municipal buildings. Text does not discuss how these plans would impact public building sector, incl. e.g. meeting Energy Star or LEED building standards, applying benchmarking to help prioritize buildings for improvement.	10/2/2016	PS0339	
0354	CPUC/CLN-3 (re page 13) Some of the text here not relevant to public buildings, e.g. re: PACE and reach codes, streamlined permitting, ... Remove or improve applicability to public buildings.	10/2/2016	PS0339	
0355	CPUC/CLN-4 See 2004 attempt to characterize size of “public” buildings in California. Dated, but may be better than nothing if there is not more recent update.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0356	CPUC/CLN-5 (re page 14) Profile data for Public Sector is lacking and text gives a weak excuse for not finding the data. Does not take a Navigant potential study to have data. Public sector buildings have LOTS of publicly-documented info on the kinds of EE measures they identify, take, save, and spend. See for example CEC data on Prop 39 K-12 schools, Community colleges data for Prop 39, UC and CSU partnerships, DGS State facilities partnerships, Corrections, CEC's long-standing public building loan program and technical assistance. I also believe AB 758 attempted to characterize the public sector building stock. Moreover, LBNL for years has been tracking the ESCO industry (largely with public building clients) and the Federal Energy management Program (FEMP) that targets federal facilities, a good portion of which are in Calif. Also could query the CPUC EM&V data base for program participants with NAICS codes for public buildings, or some equivalent codes.	10/2/2016	PS0339	
0357	CPUC/CLN-6 (re page 16-22) You need to set priorities for the current laundry lists of barriers; pretty surprising that a 1996 source is your reference, given how much progress the public sector has made with EE and climate goals.	10/2/2016	PS0339	
0358	CPUC/CLN-7 (re page 23, 32) Budgets shown do not seem to reflect the 50-65% increase in savings goals, at least in the near term until strategies for financing manage to offset the need for incentives. What is the trajectory to get to the point of not needing incentives?	10/2/2016	PS0339	
0359	CPUC/CLN-8 (re page 25) Missing any discussion of lessons learned from SoCalREN's local government facility technical assistance and turn-key	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
	implementation services.			
0360	CPUC/CLN-9 (re page 25-32) More laundry lists of current products and services and (newer?) intervention strategies in long lists. This is lacking in a clear sense of which strategies will be deployed to overcome which barriers in which market segments or overall sector. P. 29 continues to prominently feature variety of incentives. How does this mesh with our p. 23 vision to move away from incentives?	10/2/2016	PS0339	
0361	CPUC/CLN-10 (re page 25 , 32) In the "budget and Metrics" opening text, SCE punts at coming up with budget estimates for its strategies, relative to savings goals it sets on p. 25. Seems SCE should be able to estimate market uptake given the strategies and incentives it imagines offering and their costs. In fact, the PA estimates may be INPUTS to the CEC's targeting efforts, rather than the other way around.	10/2/2016	PS0339	
0362	CPUC/CLN-11 (re page 34) Metric #1 for financing and procurement, where the desired outcome is to "encourage greater customer investment in EE", would be better to set the outcome metric as a \$ investment level.	10/2/2016	PS0339	
0363	CPUC/CLN-12 (page 36 under "Coordination with Partners) Lists current local government partnerships. Will all these continue? Will they all or partially include activities that targets public buildings?	10/2/2016	PS0339	
0364	CPUC/CLN-13 (re page 39) Codes & Standards program discussion is very general. Hard to discern the value of intended strategies, expected outcomes, and relevant performance metrics.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0365	CPUC/CLN-14 (re page 42) ETP discussion is general and not informative. Also seems backward in referring to a set of “traditional measures”, rather than viewing ET as the way to push the envelope on new(er) technologies, making the case for their application and performance, and learning how to disseminate and get uptake through appropriate market channels.	10/2/2016	PS0339	
0366	CPUC/CLN-15 (re page 42) Refers to the “education of decision makers” as WE&T? Is that a conventional definition? I would think that any persuasion targeting decision-makers would be more about marketing, not “WE&T”.	10/2/2016	PS0339	
0367	CPUC/CLN-16 (re page 49) Features ZNE Schools through Prop 39 funding. But I believe Prop 309 funding was only authorized for 5 years, likely to end around 2017 or 2018, is largely committed via plans filed with CEC, and applies primarily to retrofit situations. If retained, supply evidence of how ZNE schools will have 5-10-year future traction – with what impetus, what funding, what target segments?	10/2/2016	PS0339	
0368	CPUC/CLN-17 (re page 49) Proposing picking ONE school district to “develop a roadmap to cost-effectively achieve ZNE”. I would doubt that a single road map, can be that useful given the huge variety of climates, economic situations, facility ages, ... across the SCE territory. Refers to collaboration with DOE and NREL. This probably needs additional coordination with relevant school facility and business professionals in So. Calif.	10/2/2016	PS0339	

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Reference	Recommendation	Date	Source	Response
0369	<p>Highlights of Memorandum include:</p> <ul style="list-style-type: none"> * ED suggests that SCE revise the document to reduce it by half the length (25 pp. max), with a new Overview chapter at the top that describes the LGPs, State Institutional Partnerships, K-12, and any other programs related programs such as SEEC. Budgets, savings goals, gaps, solutions, transition plans, etc. should be specified for each and then rolled up into an overall tally * SCE fails to demonstrate that SCE is complying with CPUC request to demonstrate that IOUs are moving the LGPs in the direction of greater statewide consistency. * SCE also fails to account for notable changes since 2012, notably the new PA actors operating in the local government space — RENs and CCAs. * For the ten years to come, SCE should explain how its LGPs will stay relevant alongside RENs and CCAs, and whether it supports market segmentation or competition. * Similarly, SCE should define what constitutes a partner and a partnership, minimal LGP member expectations and rewards, and whether some higher minimal threshold for LGP performance is warranted. *SCE chapter should specify proposed strategies to link qualifying local agencies with an effective LGP implementer; how such an implementer would be allowed to make decisions on behalf of its members to motivate and reward them and carry out a coordinated regional vision; and how the implementer would (or would not) serve as conduit for IOU communication and directives. 	10/2/2016	PS0340	

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Reference	Recommendation	Date	Source	Response
	<p>*SCE and the other three IOUs have a tool of enormous potential for elevating the capacity of the LGPs, but whose potential has not been captured fully due to constant staff turnover. The tool is SEEC and the best practices coordinator. SCE should provide a plan for stabilizing and growing SEEC so that, among other things, local agencies have an impartial source of expertise for matters that would include the CAECC, responding to regulatory filings, questions about the service list, filing a protest, becoming a party, and so on.</p>			
0391	<p>CSE-1 In talking about the public sector and its sub- segments (i.e., local governments, schools, hospitals); CSE recommends grouping the same sub-segment challenges and solutions into the same sections throughout the paper (as opposed to referring to the public sector at large throughout the chapter). CSE encourages SCE to reexamine some of its claims about the public sector (again, if broken out by sub- segment, certain characteristics may be easier to assign). CSE hypothesizes that in addition to reducing energy consumption, many public buildings choose to invest in energy efficiency because it saves money. CSE recommends that SCE use citations for the above claims (highlighted) in the final draft. While the chapter refers multiple times to the fact that no studies have been done for the public sector and energy efficiency market potential, CSE requests more specificity in the claim, i.e. no studies done for California? (please see input source document for important additional details). CSE recommends moving the sections “SCE’s Approach to</p>	10/2/2016	PS0344	

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Reference	Recommendation	Date	Source	Response
	<p>Achieving Sector Goals” and “Sector Vision” to the beginning of the chapter; these sections provide a detailed and concise overview of SCE’s goals and vision for the public sector.</p>			
0392	<p>CSE-2 The description of AB 802 on Pg. 11 fails to include the benchmarking and data access components of the bill (Pg.11). While the description of AB 758 calls out proposed EE services, the draft chapter does not align its proposed activities to what is prioritized in the AB 758 roadmap (Pg. 11).</p> <p>CSE recommends that SCE use aspects of the AB 758 Action Plan to frame strategy and prioritize activities for the public sector. While the chapter briefly references whole- building data access on Pg. 32 (Building Energy Benchmarking Data Access), it cites the lack of adequate data on Pg. 21. With the roll-out of AB 802, building owners (of both public and private buildings) will be able to access whole-building data (in addition to Green Button DMD and CMD) for the first time (particularly significant for separately-metered buildings). In building a benchmarking portal and offering automatic upload to Portfolio Manager, SCE will be able to retrieve building-level data for all buildings using the portal. Access to this building-level information will allow for new, and previously unknown insights, into buildings. SCE could also propose how they could prioritize outreach to buildings based on their Energy Star score (lower scores as a proxy for buildings in need of more technical assistance and rebates).</p>	10/2/2016	PS0344	

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Reference	Recommendation	Date	Source	Response
0393	<p>CSE-3 *While it’s true that lenders have not historically known how to value high-performing buildings, this particular shortcoming is changing.</p> <p>*Given the availability of OBF in the SCE territory, it would be helpful for the chapter to include insights on public sector participation and as to whether OBF is alleviating any of the aforementioned barriers to capital for EE improvements.</p> <p>*CSE requests more detail on the proposed EE revolving funds (Pg. 28)</p>	10/2/2016	PS0344	
0418	<p>TURN-1 (re page Incomplete pp. 9, 32, 16- 22, 25-32, 35- 49, Table 6 p. 34)</p> <p>Overall: SCE’s public sector BP chapter lacks quantitative information on estimated efficiency potential (p. 9), which when available should be linked to the proposed savings goals (p. 25), and proposed budget (p. 32).</p> <p>The BP reads more as a regulatory compliance document, appearing long in somewhat generalized discussions on market barriers (pp. 16 – 22), existing products and services (pp. 25 – 32), and coordination with key partners and associated proceedings (p. 35-49). This is particularly evident in reviewing the one page matrix of “Public Sector Problem Statements, Desired Sector Outcome, Intervention Strategies, and Metrics”, in which the chapter is generally captured (Table 6, p. 34).</p> <p>TURN recommends that SCE streamline the sections cited.</p>	10/3/2016	PS0350	

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Reference	Recommendation	Date	Source	Response
0419	<p>TURN-2 (re pages 35-49) The BP contains no discussion of gas usage in the public sector, or partnering with SoCalGas. This is particularly disconcerting given the lengthy Section D. "Coordination with Key Partners and Associated Proceedings". Efficiency savings and cost-effectiveness are significantly compromised by this bifurcated approach. TURN was equally confused by the fact that SCE and SCG each proposed stand-alone public sector HOPPs instead of a coordinated effort.</p> <p>TURN recommends that SCE incorporate information and data on gas efficiency into all customer sector BPs, and develop seamless customer offerings.</p>	10/3/2016	PS0350	
0420	<p>TURN-3 (re page 4) SCE concludes that Industry Standard Practice (ISP) should rarely apply to the public sector: "Additionally, there is a scale issue. A public building's kitchen or computer server system is usually considerably smaller than it would be in a commercial building. SCE concluded that Industry Standard Practice (ISP) should rarely apply to the public sector because the community the public sector serves and the scale of public sector energy systems do not compare to those of the commercial sector. Public sector investments are based on public good and on providing essential services at a minimal cost. But minimizing costs often leaves more advanced EE work for the public sector unrealized because it is expensive, while the commercial sector is not bound by the same spending</p>	10/3/2016	PS0350	

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Reference	Recommendation	Date	Source	Response
	<p>restrictions.” (emphasis added). TURNbelievesthatitisinappropriateforSC Eto unilaterally decide that ISP should not apply to the public sector. Such a generalized statement claiming that alleged differences in the “scale” of public sector and commercial energy using equipment and systems is not a reasonable basis for exempting the public sector from ISP considerations.</p> <p>SCE should proceed with the identified M&V market characterizationstudyidentifiedasneede d “asoonas possible in order to: Document industry standard practices specific to the public sector, particularly in operations, maintenance, and early replacement or “indefinite repair” practices, which may differ in different segments within the sector.” (p. 41)</p>			
0421	<p>TURN-4 (re page 13) SCE explains, “The declining cost and increased adoption of solar and battery storage is making a great impact on the EE marketplace.” This is a critically important matter, and TURN commends SCE for flagging it.</p> <p>SCE should address the impact of solar and battery storage in its discussion of overarching market trends for each BP chapter.</p>	10/3/2016	PS0350	

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Reference	Recommendation	Date	Source	Response
0422	<p>TURN-5 (re page 28) SCE summarizes the first of the public sector problem statements in Table 6 as “Financing and procurement hurdles challenge adoption”.</p> <p>With financing and public sector procurement being such significant hurdles to efficiency adoption, TURN believes it would be very helpful to expand the discussion of some of the ways SCE is working to tailor financing programs to this sector and to create EE revolving funds.</p> <p>TURN recommends that SCE provide more detail on the ways SCE is working to tailor financing programs to this sector and to create EE revolving funds. TURN recommends that SCE consider PG&E’s proposed expansion of OBF and OBR and new financing partnerships to address problems around capital availability for first costs, with a specific focus on project co-pay over the \$100,000 ceiling for OBF. PG&E states that it will explore extending OBF repayment periods beyond the current standard of five years–up to ten– to provide near-term relief for customers requiring greater flexibility for large capex investments. And, explore new, lower risk financing structures for the sector as they become available, beyond simply supplementing existing OBF (up to the current \$20,000 cap) with OBR (which carries variable risk depending on how third-party loans are structured) for greater liquidity.</p>	10/3/2016	PS0350	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0423	<p>TURN-6 (re page 48) SCE’s discussion of its Public Sector HOPPs is limited to a standalone paragraph in the next to the last page of the BP.</p> <p>It would be very helpful for SCE to incorporate the discussion of its Public Sector HOPPs into more of the core of the BP chapter, and address how NMEC could possibly assist in overcoming market barriers, including capital market investment.</p> <p>Beyond this, TURN recommends that SCE explore using AMI data and innovative meter-measured performance strategies for site-specific whole building programs to stimulate broader market interest in NMEC-based pay-for-performance programs. Such an approach could be used to attempt to spur private sector innovation and capital markets investment, thus building a market for efficiency, creating transparent and real time accounting for savings using smart meter data, increasing quality installations by making contractors accountable to measured performance, and ultimately reducing program administration and evaluation costs by making the industry (and not just the program) responsible for performance risk.</p>	10/3/2016	PS0350	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0424	<p>TURN-7 (General Comment) Customer sector goals and program savings, budgets, and cost-effectiveness are forward looking. The BPs are intended to be integral to California moving the current generally flat or stagnant needle on energy efficiency. Some quantitative context to the current portfolios and programs would be very helpful.</p> <p>We recommend that all data on projected customer sector goals and program savings, budgets, and cost-effectiveness be given some context relative to ongoing customer sector activities and accomplishments. There needs to be some demonstration as to how the BP will advance savings and improve cost-effectiveness.</p>	10/3/2016	PS0350	
0425	<p>TURN-8 (General Comment) It is not clear whether projected savings are gross annual. In D.16-08-019 (atp.21), the Commission directed a return to net goals and the development of cumulative goals for application in 2018 to support the State’s SB 350 efforts.</p> <p>If not already included, we recommend that SCE provide projected customer sector goals and program savings in net annual and net cumulative form, with the basis for net provided, and cumulative specified by the estimated average EUL by customer sector and key programs. Indicate the basis (ie end use, measures) for the estimated average EUL(s).</p>	10/3/2016	PS0350	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0440	<p>UC/CSU-1 (re page 38) At the top of page 38 under section b) Statewide Program Coordination, there are several key topics that have only been addressed with placeholders, including "How lead PA will operate", "IOU/PA lead coordination" and "Solicitation strategy for implementation". Based on the intent of the decision to create statewide consistency and efficiencies, these items must be addressed in a way that effectively supportsthesegoals. There needs to be very clear language on how all IOUs will work together to provide consistent offerings (i.e. identical program processes and project eligibility) for customers in statewide partnerships. The lead PA can leverage the authority provided in the decision to standardize all program processes and project eligibility across all IOUs as needed</p>	10/3/2016	PS0353	
0441	<p>UC/CSU-2 (re page 38) SCE appears to suggest that the public sector will be transitioned to third party programs. The language in the decision does not specifically make this requirement, and UC would like to understand in more detail what this could mean for our statewide partnership, as currently we utilize almost no third party programs. From a high level, transitioning the UC/CSU partnership to a third party program would create new inefficiencies and cost by inserting a management layer between the customer and the utility that does not exist today, while creating no added value to the customer or cost savings. Providejustificationand more detail on the requirement/plan to transition statewide institutional partnerships to third party programs.</p>	10/3/2016	PS0353	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0442	UC/CSU-3 (re page 38) The timing of an [Public Sector] RFP being released prior to Business Plans being finalized could be problematic in that the solicitation would not incorporate input from public sector stakeholders. The role and requirements of Statewide Program Implementers is not defined, and depending on how this is developed in the Business Plans, it may make sense for a public sector customer to pursue this role. Provide clarification and more detail on what this RFP will include and how it will accommodate the potential for public sector customers to pursue the Statewide Program Implementer role.	10/3/2016	PS0353	
0444	NAESCO - We suggest that the IOUs use the information described below to create a common template for all their business plans. A common template will greatly facilitate stakeholder review and the Commission's analysis which is necessary for approval of Business Plans. [see source input document PS0360 for several page description of the outline]	10/3/2016	PS0360	
0445	NAESCO NAESCO believes that the Commission's requirements for statewide administration and third party implementation are very clear. In their October 19 presentations, SCE and the other utilities should describe overall bidding plans, including programs not specifically identified in the decision, for 2017, 2018, 2019 and 2020. Those plans should include bidding timelines from issuance of RFPs to contract signing for every program to be bid out. For each year, the utilities should list the programs implemented in their service territories, broken out by utility-	10/3/2016	PS0360	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	<p>implemented and third party implemented programs. In order to meet the Commission’s requirement of filing a plan that demonstrates their achieving the Commission’s minimum of 60 percent third party program spending as a percent of the total portfolio spending, each utility’s Business Plan filing should include annual budgets for the years 2017 through 2020 broken out by major category: administration; Implementation (further broken out into utility-implemented programs versus third party programs); marketing (also broken out by utility program-related versus third party program-related) and EM&V.</p>			
0446	<p>NAESCO Prior to any utility program implementation, the utilities, working with the CAEECC and other stakeholders, should (1) establish an objective framework with clear criteria that must be applied in determining that a utility must deliver a program, and (2) show how those criteria are met in the case of utility implementation of a particular program. The utilities Business Plans should describe this process and how outcomes were achieved.</p>	10/3/2016	PS0360	
0447	<p>NAESCO - The public sector and the residential sector are two markets that are served by a large, sophisticated community of implementers. The end use technologies used in these sectors have seen significant technological improvements in recent years (advanced lighting, energy management systems, smart thermostats, heat pumps, etc.). For both the MUSH and residential</p>	10/3/2016	PS0360	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	markets, SCE and the other utility administrators should establish meaningful budgets for truly open solicitations that allow third parties to propose new, innovative program designs.			
0496	<p>ORA-1 (re page 23/32) Budgets do not align with 10-year vision for the sector</p> <ul style="list-style-type: none"> o SCE states on p.23 that “with the exception of complex or novel projects, public sector customers should no longer be reliant on incentive to develop and implement EE projects.” o However, the budget table on p.32 shows stable budgets through 2027, which is inconsistent with incentives declining to near zero. o The long-term goal is either not credible or the budget in out-years should decline substantially 	10/3/2016	PS0357	
0497	<p>ORA-2 (re page 34) Metrics do not align with the 10-year vision for the sector</p> <ul style="list-style-type: none"> o SCE’s success metrics are all based on participation levels; however, the 10-year vision is that customers will no longer be participating in incentive programs. o Fundamental disconnect between a metric of “number of projects that receive on incentive” increasing through year 10 and a vision of declining incentives to zero by year 10. 	10/3/2016	PS0357	
0498	<p>ORA-3 - Metrics do not align with the problem statement or intervention strategy</p> <ul style="list-style-type: none"> o Problem statement of lack of visibility for building performance data and intervention strategies around increasing customer access to data do not match a sector outcome metric of the number of projects receiving an incentive o Metric must measure something 	10/3/2016	PS0357	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	meaningful that represents success/failure of the intervention strategy			
0499	<p>ORA-4 (re page 33) Metrics must be credible and stable in order for BPs to represent a plan whose success/failure can be accurately assessed</p> <ul style="list-style-type: none"> o BPs cannot be approved with caveats such as that on p.33 that “SCE plans to refine [the metrics] once more analyses are completed....if historical data on these sectors does not exist or is too sparse, then SCE will update these metrics targets after sector-specific evaluations have been completed.” o If metrics are constantly moving targets, then the accountability mechanism is destroyed and there is no marker to judge whether or not progress is being made, whether strategies are producing results, and whether the administrator is succeeding. 	10/3/2016	PS0357	
0500	<p>ORA-5 - Fails to address sector-specific market opportunities/advantages in addition to market barriers</p> <ul style="list-style-type: none"> o Many public buildings are have stable, long-term ownership and can have longer time horizons for capital investment 	10/3/2016	PS0357	
0501	<p>ORA-6 (page 28-29) Intervention strategies should address specific market barriers and focus on the most important barriers first</p> <ul style="list-style-type: none"> o Example: SCE intervention strategies (on pp.28-29) are just a list of current programs. “Core program” is not an intervention strategy, it is an administrative category. 	10/3/2016	PS0357	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0502	<p>ORA-7 (re page 16-22) Contains lengthy sections that do not ‘push the narrative forward’ (</p> <ul style="list-style-type: none"> o Items included in the early sections should set up the actual intervention strategies, rather than a catalogue that is largely unused in the actual planning sections o Example: MTdiscussion on pp.16-22 develops a laundry list of possible market barriers, but only three are included in the actual intervention plan discussion and these are vague/high level and do not actually use the insights in the preceding discussion 	10/3/2016	PS0357	
0503	<p>ORA-8 (re page 4, 12) Assertions of fact or policy need to be fully supported by evidence and citation, not simply opinion</p> <ul style="list-style-type: none"> o Example: assertion on p.4 that Industry Standard Practice should rarely apply to the public sector has no citation or evidence to support o Example: assertion on p.12 that the vast majority of low-hanging fruit has been captured “as seen in recent impact evaluations and CPUC dispositions” fails to cite a single study o Example: assertion on p.12 that spillover is not quantified ignores an ED evaluation study in progress that aims to quantify spillover o Example: assertion on p.12 that public sector GHG or sustainability mandates reduce PA attribution for program influence fails to cite any evidence that this is current practice. 	10/3/2016	PS0357	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0504	<p>ORA-9 (re page 15-22) Studies that are referenced should be cited accurately and use best available recent information</p> <ul style="list-style-type: none"> o Example :reference to Navigant IP study on p.15 says the study had “very few recommendations for areas under SCE control” is factually inaccurate; the study had many recommendations that are pertinent to SCE territory o Example: indiscussion of market transformation on pp.16-22, SCE cites a 1996 paper on market transformation produced under an entirely different regulatory structure but fails to cite and discuss the 2013 ED MT white paper written by some of the same authors. 	10/3/2016	PS0357	
0541	Notes page 8 - Currently, we don't have a program implementer for our [UC] partnership. I see no value in introducing a program implementer. I'd like to know more about the process for introducing program implementer for our partnership.	10/3/2016	Not Yet Posted	
0556	Notes page 21 - Comment (from ED): Primary focuses on downstream strategies and tactics. The Decision identifies that Statewide programs should be designed to achieve market transformation. SDG&E is tentatively assigned Statewide administrators for non-residential and residential HVVAC. Where will Statewide strategies appear in this BP?	10/3/2016	Not Yet Posted	
0557	Notes page 22 - With regard to bundling, we want to make sure PAs make room for smaller implementers. Hopefully smaller contractors will also have a voice.	10/3/2016	Not Yet Posted	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0558	<p>Notes page 22 -</p> <ul style="list-style-type: none"> • The draft chapter can be made shorter. What is the pitch? Why should ratepayer dollars be used toward public sector? • Regarding goals (p. 24): you need to have specific goals that are relatively concrete so we can see if you are achieving them. • Budgets don't appear to align with 10 year plan for sector (p. 23). Budgets are stable but should be declining. There is a disconnect between increasing programs and budgets. • Assertions need to be fully supported – not just simply stated (example, p. 4). 	10/3/2016	Not Yet Posted	
0559	<p>Notes page 22 -</p> <ul style="list-style-type: none"> • I also agree there was some content in the draft chapter that was unnecessary. You could skim through definitions. • Goals are not totally clear. • Maybe forgot column on baseline on table (at p. 34?). I can't really tell what you are doing here. • This raises the issue of what is the right level of information necessary to relay what PA is doing and where it is going? 	10/3/2016	Not Yet Posted	
0560	<p>Notes page 23 -</p> <p>One of ORA's expectations will be a bottom up budget including detailed description of continuing programs as they are, internal staff and administration and overhead. Program budgets need to get built from bottom up every once in a while. Annual advice letters will address incremental changes based on what has transpired from bottom up budget. Bottom up budgets will follow for BP sector chapters. It has been a really long time since utilities provided accounting for what makes \$1billion/year. Annual advice letters are</p>	10/3/2016	Not Yet Posted	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
	not enough.			
0561	Notes page 23 - I'd like to second comments of CPUC that BPs should start with market estimate from available data. First, always start with an estimate of what the market is. There are other evaluations besides Navigant studies. Second, PAs need to set up what the target market is. Third, PAs need to make an overarching statement about what kind of investment is required to capture the target market and what the benefits will be. If you go through this process, you will see that Southern California Edison public sector program is off by 1-2 orders of magnitude. We very much support comments of the Coalition for Energy Efficiency about draft chapter lacking mandates and specifics about what is required to be included.	10/3/2016	Not Yet Posted	
0562	Notes page 23 - I have three high level comments: <ul style="list-style-type: none"> • I didn't see comments about gas usage. There needs to be a partnership between the electric and gas company in the public sector. • Page 4: commercial sector is not bound – needs factual basis to support assertions • p. 25: for all BPs, when you make your projections of savings, need to clarify if gross or net, annual or cumulative. 	10/4/2016	Not Yet Posted	
0563	Notes Page 24 - see extensive list of recommendations from the state of California on this page of the notes.	10/4/2016	Not Yet Posted	

Appendix D: External Stakeholder Observations

Reference	Recommendation	Date	Source	Response
0564	Notes page 24 - • p. 37 includes a large list of to dos. IOU/PA coordination should be customer driven partnerships, not market driven programs. • When you have institutional partnership, Statewide process is more difficult. I would like to know why institutional partnerships were included in Statewide. This doesn't work with institutional partnerships.	10/4/2016	Not Yet Posted	
0565	Draft page 25 - ZNE energy goals for state buildings has not been acknowledged at all in this draft chapter. That should be added. There should be coordination with C&S in advancing that goal. It is problematic to leave this issue out of draft chapter.	10/4/2016	Not Yet Posted	
0566	Notes page 25 - Curiously missing from SCE's draft chapter is any reference to lessons learned from SoCalREN experience on buildings	10/4/2016	Not Yet Posted	

Appendix E: Glossary of Terms & Definitions

Appendix E: Common Terms & Definitions	
Program Intervention	A deliberate effort by utilities to intervene in the market to reduce market barriers and thereby change the level of investment in (or practice of) energy efficiency. An intervention's success in reducing market barriers, therefore, hinges on whether it leads to or causes a net beneficial outcome from a societal perspective.
Program	A set of tactics offered to the customer as part of a program intervention.
Tactics	An action embodied within a program to carry out a program intervention strategy.
Sector Metric (aka, market effect metric)	Indicator of progress towards achieving desired market effect(s). For the purpose of developing EE business plans, sector metrics only reflect the PA program intervention strategies, and rely on readily available data to allow for active monitoring by PA of progress towards achieving desired market effect.
Program Intervention Metric	Indicator of progress towards achieving a desired market effect by a program intervention through monitoring of program strategy output activities. A program's theory explains why the desired market effects are expected to result from the program's output and activities.
Baseline	The minimum or starting point used to compare the metric progress to achieving stated target.
Sector Target	The quantitative goal towards which a sector metric tracks progress. Sector metrics and targets can be used with both sector-level outputs and sector-level outcomes, whichever is more useful to the PA.
Program Target	The numeric value assigned to the program metric. The numeric value assigned to the program metric. The quantitative goal towards which a program metric tracks progress. Program metrics and targets can be used with both program outputs and program outcomes, whichever is more useful to the PA.
Desired market effect	A market effect is a change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).
Problem Statement	A summary of market barriers identified within a customer sector.
Market Barriers	Those market characteristics that inhibit the natural market adoption of energy efficiency without need for market intervention. (see, set of market barrier)
Short-term	1-3 years
Mid-term	4-7 years
Long-term	8-10+ years

Appendix E: Common Terms & Definitions

Market Channel	The point of entrance in the marketplace by a program. (downstream, midstream, upstream)
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DRAFT

Residential Sector Chapter

Draft

October 18, 2016



A  Sempra Energy utility

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A. Executive Summary

Southern California Gas Company’s residential customers represent about 23% of the natural gas consumed by all customers within the service territory. The residential sector is made up of two primary segments: single-family and multi-family. The vast majority of the customers live in milder climates compared to the rest of the nation. The customer base, especially in the multi-family segment, is very diverse. Due to continued higher home prices and rent, the residential sector is experiencing an increase in multi-family new construction starts and increased number of renters in the single-family segment. Such market changes are having a lasting effect on customer energy usage patterns.

The residential sector business plan includes a combination of proven and newer program strategies coupled with inventive approaches to efficiently identify customers with the greatest energy efficiency (EE) opportunities using data analytic advancements enabled by SoCalGas’ newly implemented advanced meter infrastructure. Using data analytics and traditional outreach approaches, SoCalGas will offer an integrated set of program strategies that meet the customer’s unique energy efficiency needs. The residential sector represents a very diverse customer base that uses energy in very common ways. There is significant EE potential due to the number of residential customers within the service territory. Specific program strategies will be offered to the customer to permanently capture these energy savings. To encourage greater adoption of energy efficiency among all residential customer segments, SoCalGas will offer a simple, low cost suite of programs that are tailored to the unique customer characteristics of the residential sector.

1. Summary Tables [Pending Revised Avoided Costs]

Table A.1: Sector Forecast Residential

Program Impacts	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
MWh	TBD										
MW	TBD										
Therms	TBD										

Emissions

CO2	TBD										
PM-10	TBD										
NOx	TBD										

Cost-effectiveness TRC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

Cost-effectiveness PAC

Cost	TBD										
Benefits	TBD										
Net Benefits	TBD										
Ratio	TBD										

2. Proposal Compared To Prior Cycles

In past program cycles, program portfolios were offered based on specific programs and/or technologies. The sectorial business plan approach is based on customer needs and expectations, within like customer groups, proactively offered in a deliberate and efficient manner in order to significantly increase the adoption of customer energy efficiency solutions among all customer types within the sector. Taking advantage of new AMI technology, customer energy usage habits can now be examined and categorized (e.g., psychographics), through efficient and continuous data analytics, to identify how customers can permanently incorporate energy efficiency into their homes. No longer are energy efficiency programs passively offered when customers decide to participate. Now, customers are actively encouraged to modify energy behaviors and to invest in the right energy efficiency upgrades at the right time, based on a coordinated set of program offerings, to improve the overall efficiency of their homes.

In addition to proven program strategies, SoCalGas will incorporate new program strategies and corresponding program tactics to arrive at a complete EE solution set for the residential customer. The proven and new program strategies are further detailed in the Program Intervention Strategies section. These offerings will be introduced to the customers over time and may be withdrawn and retooled in order to adapt to market changes and responses. The new program approaches and the proposed implementation timeframe are summarized below:

Program Strategy	Program Tactic	Implementation Timing*
Partnering	Industry Partnering	Near-term
	Customer Partnering	Near-term
	Utility Partnering	Near-Term
Intelligent Outreach	Data Analytics	Near, mid-term
	Virtual Engagement	Near, mid-term
	Energy Management Technologies	Near-term
	Disadvantaged Communities	Near-term
	Sharing EE Best Practices	Near-term
	Expanded Single Point of Contact	Near-term
	EE Home Branding & Benchmarking	Near-term
Homeowner Resale		
	Pay-for-Performance	Near-term
	Contractor Incentives	Near-term
Customer Incentives		
Direct Install		
	Standard Direct Install	Near-term
	Comprehensive Direct Install	Near-term

*Note: Near-term = 1-3 years; mid-term = 4-7 years; long-term = 8+ years.

3. Response To Sector Challenges

The residential sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engage the residential customer to achieve both stranded market and economic energy efficiency potential. The residential sector, both single-family and multifamily segments, is generally characterized as follows:

- Very large number of residential accounts;
- Low natural gas consumption due to the region’s mild climates;
- Trouble overcoming the high first cost to energy efficiency, especially for whole house solutions;
- Limited opportunities for natural gas energy efficiency; and
- A prolific split incentive barrier issue across both multi-family and single-family segments including new construction.

B. Market Characterization

The residential sector is entering a period of great change with new entrants, new innovative energy efficiency programs, and government regulations promising to reshape the market in the upcoming years. However, to fully understand where the residential sector is headed, we must first establish its current characteristics. In 2012, the residential sector accounted for 21% of total primary energy consumption. In addition, it has been recently reported that California households consume about 62 million British thermal units of energy per home annually, 31% lower than the U.S. average, due largely to California’s mild climate.

Segments and sub-segments

The residential sector is generally segmented into two groups: single-family and multifamily. Specifically, within the residential market there are four metered segments: single-family, multifamily individual-metered, multifamily master-metered and other (which includes mobile homes and central facilities). As shown in Table B.1, in 2015 there were nearly 3.7 million existing single-family homes and over 1.8 million existing multifamily units in SoCalGas’ service territory.

**Table B.1: SoCalGas Residential Profile
(by segment)**

Metered Segment Type	Single Family	Multi Family	Mobile Home	Grand Total
Individually Metered	3,683,251	1,742,353		5,425,604
Master Metered		34,369	1,469	35,838
Central Facility		74,104	10	74,114
Dual Facility		4,612	4	4,616
Total	3,683,251	1,855,438	1,483	5,540,172

1. Customer Landscape

a. Natural Gas Consumption

The residential sector constitutes about 23% of the natural gas consumption within the service territory. In addition, it has been recently reported that California households consume about 62 million therms per home annually, 31% lower than the U.S. average, due largely to California’s mild climate.

Residential Sector Energy Usage

In 2015, SoCalGas residential customers consumed approximately 2 billion therms. Residential customers primarily use gas for space and water heating, as shown in Figure 1.1. Natural gas consumption is highest among the single-family with over 70% of therms consumed in the residential sector, as shown in Figure 1.2.

The majority of SoCalGas residential customers reside in mild climate zones, specifically coastal and valley regions. Residential usage is weather-dependent and, as a result, is highest among inland communities (climate zones 8 and 9) with larger populations. In 2015, the single-family and multifamily customers consumed *about* 3.6 million and 1.3 million therms, respectively. Residential annual consumption remains steady with no varying spikes in usage within each segment.

Figure 1.1: 2015 Residential Usage by End-Use

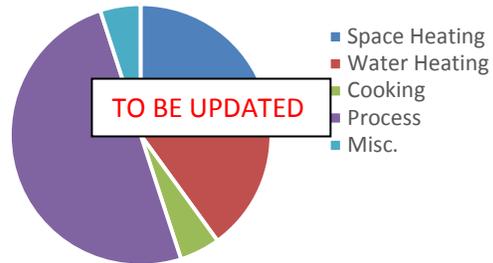
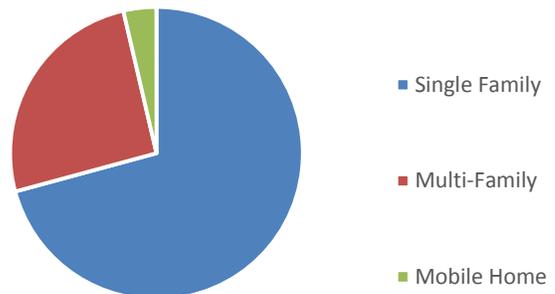


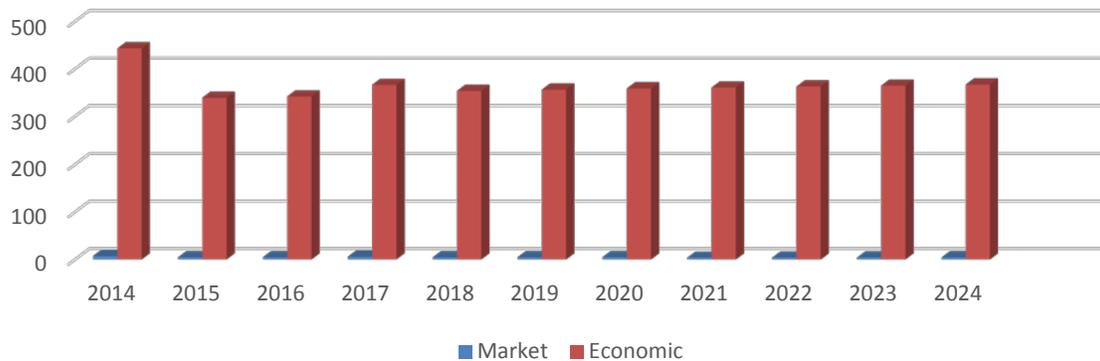
Figure 1.2: 2015 Residential Energy Savings by Segment



b. Market & Economic EE Potential

The estimated market and economic EE potential for the residential sector, from 2014 through 2024, is shown in Figure 1.3. The EE potential is projected to increase in the multi-family segment and, in contrast, single-family segment appears to decline over the next few years. The two residential end uses with the highest energy efficiency potential include: water heating and appliances.

Figure 1.3: EE Potential - Residential Market & Economic By Year



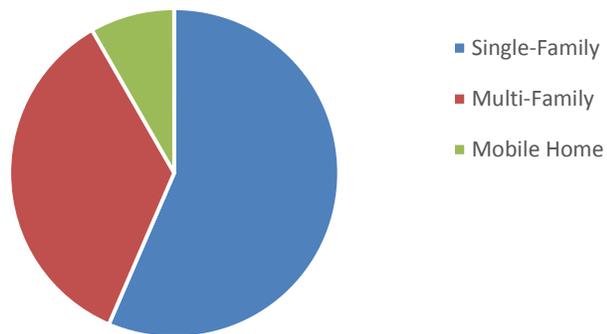
Historical Sector Performance

Segment

From 2010 to 2015, SoCalGas' residential sector saved 37.7 million therms of gas representing about XX% of the overall energy savings of SoCalGas' energy efficiency portfolio. As shown in Figure 1.4, the single-family segment accounted for the largest portion of residential sector program savings with just over 4 million therms saved annually.

By program, the Plug Load Appliance program produced the greatest level of energy savings due, in large part, to the high adoption of EE water heating measures (e.g., clothes washers). The Whole Building program was the second highest producer of energy savings but also represented the highest spend during this time period. Considering the program fully launched in 2013, it offers the least cost-effective program design. There remain significant opportunities in pool heating with the single-family segment and clothes washer upgrades in the multi-family segment.

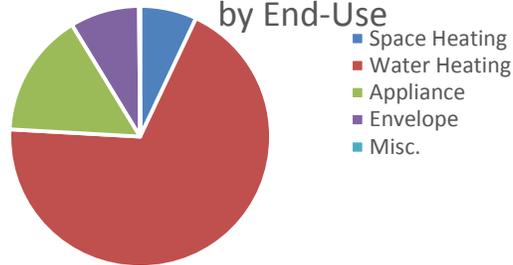
Figure 1.4: 2010-2015 Residential Energy Savings by Segment



Energy Savings By End-Use

Figure 1.5 depicts the total energy savings from the residential sector by end use. Between 2010 and 2015, both the space and water heating end-uses had the greatest level of energy savings. The water heaters, low-flow aerators, and showerhead measures represented the largest energy savings, followed by clothes washers and recirculation pumps measures in the multifamily segment.

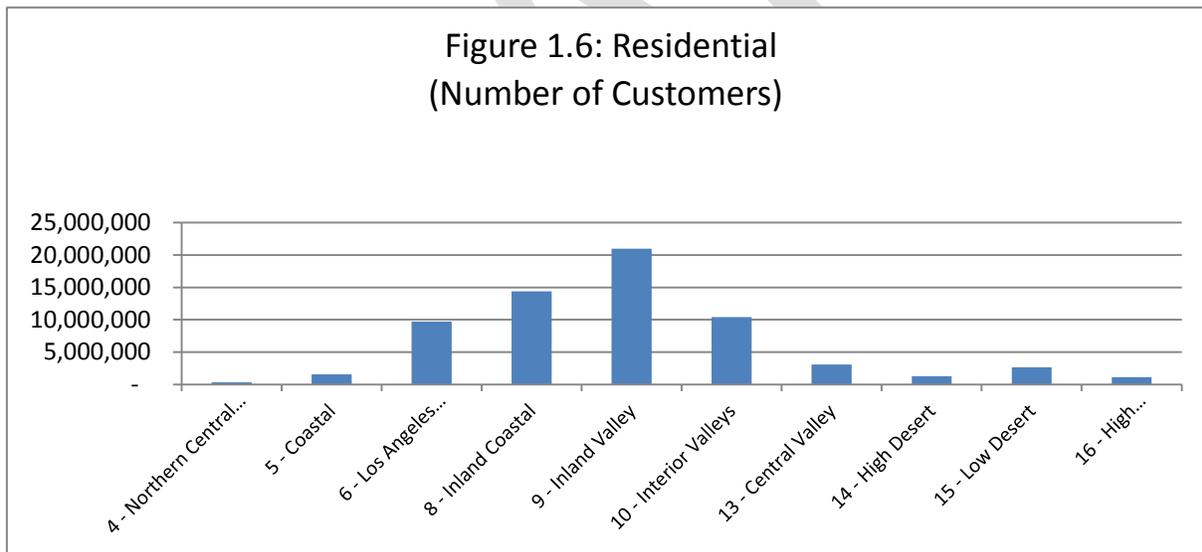
Figure 1.5: 2010 - 2015 Residential Energy Savings by End-Use



Residential Sector Segmentation by NAICS

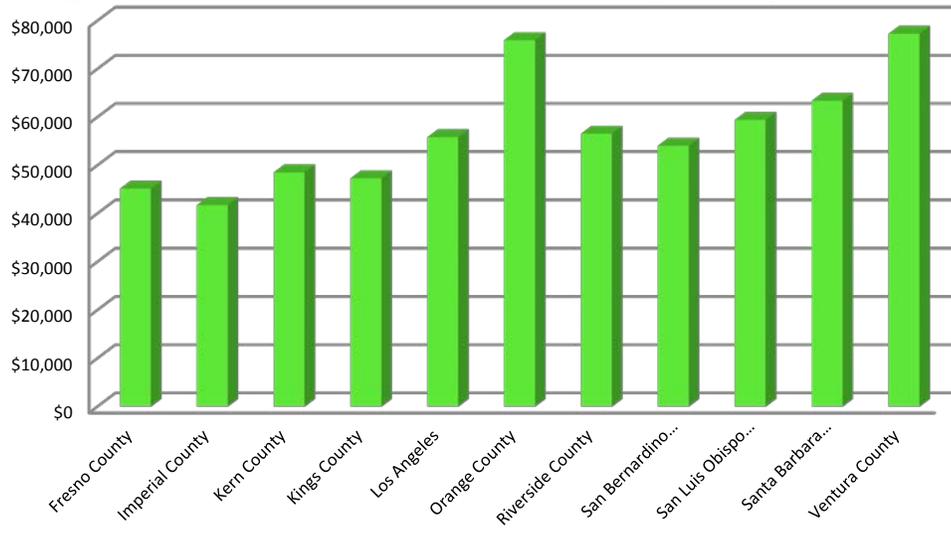
A deeper dive into identifying characteristics of the residential sector reveals more information on the number of households and a glimpse of income levels within the state. These key statistics can play a large role in indicating how people spend, what level of incomes reside in the service territory and the customer’s ability to invest in energy efficiency upgrades. From Figure 1.6, it is evident that Los Angeles County has the largest number of meters in the SoCalGas service territory.

Figure 1.6: Residential (Number of Customers)



Yet in Figure 1.7, it is shown that the highest median incomes reside in counties with some of the lower household numbers, specifically Orange and Ventura County. There the average median income ranges from \$75,000 to \$77,000 whereas the median income in Los Angeles is only \$55,000.

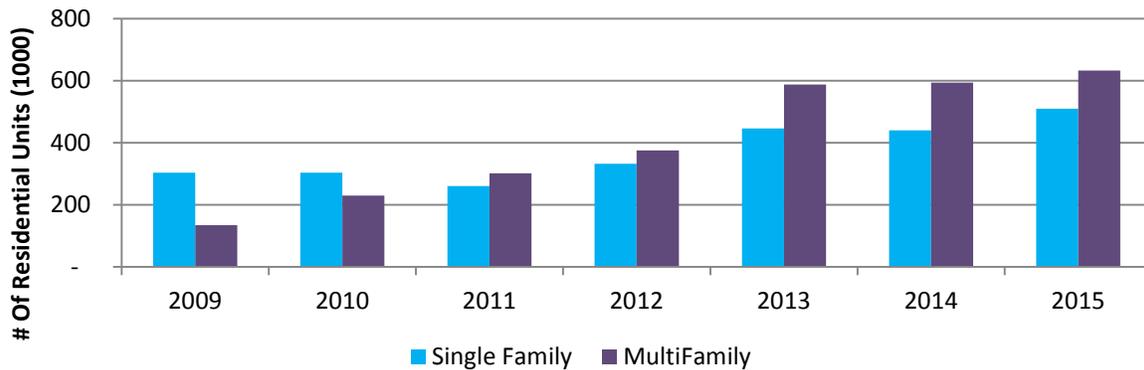
Figure 1.7: Median Household Income by County



Residential new construction starts have been increasing annually by 14% from 2009 to 2015. In 2015 alone, 510 single family and 633 multifamily building permits were issued for new residential units, as shown in Figure 1.8. New construction multi-family units have been increasing, with a growth of 21% from 2009 to 2015, surpassing the growth of single-family units.

Figure 1.8

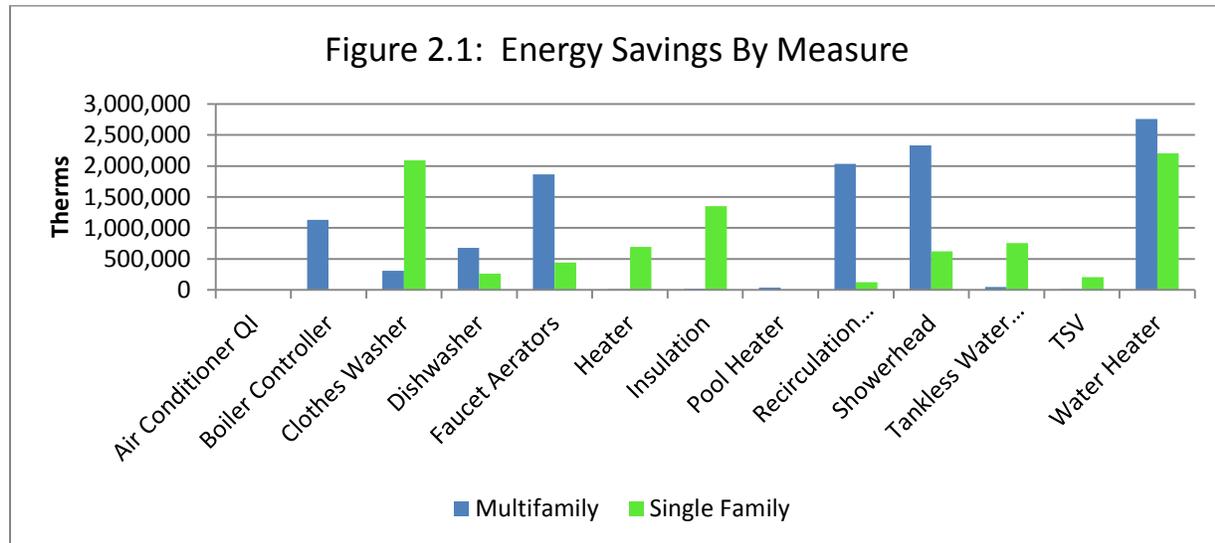
New Construction Residential Units by Building Permits



2. Market Intelligence

Energy Efficiency Equipment Sales Share

The residential sector usage is driven primarily by water and space heating. The most common equipment used across the sector are primarily water heating measures, as shown in Figure 2.1. All residential segments rely mostly on these common measures. The multi-family segment also relies heavily on recirculation pumps because of centralized water heating applications common across the segment.



Key Market Actors

In order to increase market adoption of energy efficient equipment in the residential sector, SoCalGas will focus on key market actors including equipment manufacturers, installation contractors, property management companies, retailers, and distributors. Permanent modifications to stocking practices, installation, and information sharing practices, equipment performance uncertainties, and availability of efficient equipment will lead to transforming the market to achieve permanent behavior changes in customer's installation of efficient equipment.

3. Industry Trends

Key trends in the residential sector within SoCalGas' service territory include:

Builders' Focus on Multifamily New Construction. Due to higher construction and property costs, new homebuilders are building multifamily dwellings in areas in southern California historically dominated by the single-family segment. For example, Orange County, an area where single-family construction has dominated for decades, is now experiencing higher multifamily construction starts in metropolitan areas throughout the county.¹

Very High Levels of Renters in Single-family Segment. Over the past few years, the single-family segment has experienced a growth in rentals of single-family dwellings. Los Angeles County has

¹ 2016 Multifamily Forecast Report, USC Lusk Casden Real Estate Economic Forecast, pp. 12 and 22.

experience an increase in rental demand in all segments since 2010², causing issues regarding split-incentives to become more prevalent. Due to the high cost of home ownership relative to income, this trend is expected to continue.

Higher Levels of Owners in Multifamily Segment. With new construction focus on low-rise multifamily sub-segment, the southern California region is experiencing higher rates of homeownership within the multifamily segment.

Escalating Building Code Driving Developers to Build Only to Code. California's aggressive Title 24 code changes are driving developers away from incorporating above-code energy efficiency into new construction. The higher costs to comply with California's building codes are causing developers to avoid above-code energy efficiency as a way to control costs and be competitive. This is further impacted by recent California Energy Commission (CEC) code changes to allow builders to incorporate solar-ready rooftop construction in lieu of energy efficiency upgrades. These industry trends are creating lost opportunities in the residential new construction market.

Residential Preference for Solar Photovoltaic (PV) Over Energy Efficiency. Lower solar PV costs (material, installation) coupled with higher EE costs are providing a mis-incentive for customers to "over" install PV (where PV install equals home energy consumption) and ignore dual-fuel EE opportunities.

4. Sector Influences

a. Applicable Legislation and Regulatory Directives

There are a number of newly adopted legislative bills providing specific guidance for the future of energy efficiency in California. From Senate Bill (SB) 350 to Assembly Bills (AB) 793, 758 and 802, there are numerous directives that are helping to shape the next generation of energy efficiency program offerings. SB 350 sets forth a goal to double the levels of energy efficiency in California by 2030. With this goal set, a number of legislative and regulatory directives are provided to SoCalGas, and other program administrators, to help shape the energy efficiency business plans. The CPUC has also issued guidance to program administrators on how to further formulate the energy efficiency business plans. In response, SoCalGas has reshaped existing program strategies and added new ones to meet these specific directives. A summary of the recent legislative and regulatory directives along with SoCalGas' proposed program strategies to address these directives are detailed in Appendix B.

b. EM&V Study Recommendations & Observations

The evaluation, measurement, and verification (EM&V) process includes residential sector-related market studies, load impact, programs, process evaluations, and potential studies on energy efficiency programs and market segments that cover program years 2006-2015.

The residential sector business plan incorporates, with and without modifications, various recommendations that have not already been incorporated into the existing energy efficiency programs. A list of referenced EM&V studies directed at the residential sector is listed in Appendix C of this business plan.

² HUD PD&R Housing Market Profiles: Los Angeles-Long Beach-Glendale, California, September 1, 2013, p. 4. Accessed at https://www.huduser.gov/periodicals/USHMC/reg/LosAngelesCA_HMP_508_Sep13.pdf.

c. External Stakeholder Input

As part of the EE business planning process, SoCalGas received valuable input from various external stakeholders primarily through the California Energy Efficiency Coordinating Committee (CAEECC). The stakeholder input, in part, helped shape the program strategies offered in the business plan. Specific CAEECC recommendations and corresponding responses are provided in Appendix D of this business plan.

C. Vision, Goals, Objectives and Sector Strategies

The residential sector vision, goals, and objectives set the tone and direction for the next generation of program offerings. It is vitally important that they are clear, concise and connected to California's overall energy efficiency policies. The residential sector business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape the sector vision. The business plan has a number of other influences including: Commission policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input, and program experience.

The residential sector goals and objectives were borne from the energy efficiency business planning efforts and reflect the areas of focus needed to achieve the sector vision. In addition, sector-specific tactical objectives are provided to set clear and tangible tasks that support the sector goals and objectives. Over time, the goals and corresponding objectives may be reset to adapt to changes in the residential sector, regulatory policies, laws, and customer response to program offerings.

1. Residential Sector Vision

Residential energy use will be transformed to ultra-high levels of energy efficiency. All cost-effective potential for energy efficiency will be routinely realized for all residential properties and will fully integrate with other customer demand-side management options including clean renewables, on a site-specific basis.

2. Residential Sector Goals

- **Achieve comprehensive, deep EE levels through a whole house approach.** Homeowners, through a whole house approach, will achieve comprehensive, deeper EE levels in all residential segments focused on home gas-related equipment (e.g., HVAC systems), building envelope, and appliances.
- **Increase EE adoption levels for all residential customers with a focus on multi-family customers with high EE potential through efficient outreach and effective offerings.** Deliver effective, low touch customers solutions leveraging data analytic techniques to targeted customers to increase the energy efficiency adoption.
- **Increase adoption of EE gas appliances and energy management devices.** Develop and install energy management devices and gas appliances that use less energy and provide tools to enable residential customers to cost-efficiently manage their energy usage.
- **Through the promotion of gas efficiency, enable new construction to achieve zero net energy performance levels.** New construction will reach zero net energy performance (including clean, onsite-distributed generation) for all new single homes by 2020.

3. Residential Sector Objectives

- **Whole Home Approach.** Develop, offer, and promote comprehensive solutions for single and multi-family homes, including energy efficiency measures, demand management tools and real-time information in order to maximize economic decision-making and energy savings.
- **Deeper Energy Efficiency.** Create high levels of customer demand for progressively more efficient homes through a coordinated delivery of program strategies. These strategies are designed to reduce perceived market barriers and achieve deeper energy savings in all segments with a focus on multifamily segment and disadvantaged communities.
- **Adoption of EE Gas Appliances and Energy Management Technologies.** Partner with manufacturers, retailers, contractors and other key market actors to move customers to efficient gas appliances. Promote energy management technologies and other behavioral-related EE solutions.
- **Make EE the Preferred Option in New Construction Zero Net Energy (ZNE).** Partner with builders, CEC and other key market actors to build the most gas energy efficient single-family and multifamily homes while moving to achieve California's ZNE goals to ensure energy efficiency is the first consideration in the design, build and purchase of a new home.

4. Residential Sector Tactical Objectives

- i. Create simple, low touch interface to efficiently deliver EE rebates to residential customers.
- ii. Create a whole-home approach that is cost-efficient with improved cost-efficiency that can be self-sustaining in the long-term.
- iii. Create data analytic methods to efficiently identify residential homes and buildings with higher EE potential and provide tailored energy assessment to lead customer to make immediate EE behavioral changes and EE equipment purchases.
- iv. Modify the residential new construction offering to increase participation and promotion of above code energy efficiency to capture all potential lost opportunities.
- v. Promote targeted comprehensive direct install solutions to residential customers with higher EE potential and in coordination with low income energy efficiency offerings.
- vi. Enhance the single-point-contact to increase program participation in multifamily segment.
- vii. Deliver targeted outreach to disadvantaged communities³ including rural and multi-ethnic communities.
- viii. Support the promotion of energy efficient homes in the residential (single-family, multifamily, mobile homes) resale market.
- ix. Enhance energy advisor offerings to capture reportable, behavioral energy efficiency savings.
- x. Merge AMI technology with advanced energy efficiency and management technologies to permanently modify residential customer behavior to produce reliable energy efficiency savings.
- xi. Create partnering opportunities with other utilities, program administrators, water agencies, and industry associations to: reach more residential customers; promote deeper energy efficiency; simplify customer engagement; intervene earlier in the customer's energy efficiency decision-making process and reduce costs through a cost-sharing partner model.
- xii. Reset relationship with building industry to improve the adoption of above code energy efficiency in residential new construction.

³ Section 39711 of the Health and Safety Code as identified by California Environmental Protection Agency, Designation Of Disadvantaged Communities Pursuant To Senate Bill 525 (De Leon), October 2014.

D. Program Intervention Strategies & Delivery

Since the 1990s, California has embraced the notion that energy efficiency program intervention strategies, coupled with government intervention (e.g., public policies and laws), introduced into a market can permanently reduce market barriers so customers can achieve higher levels of energy efficiency. In a transformed market, customers will naturally adopt higher levels of energy efficiency without the need for such program and government interventions. All programs, resource and non-resource, contribute, in some way, to reducing market barriers in order to achieve the desired, long-lasting market effects.⁴ The current CPUC market transformation definition is stated below:

“Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.”⁵

To identify the appropriate program strategies, the business plan identifies sector-specific problem statements with corresponding resolutions or desired outcomes. Sector-specific program strategies are presented that will reduce current market barriers. Program delivery will rely on a combination of third party delivered statewide and local programs. These programs will be supplemented with SoCalGas support that will enable third party program implementers and customers to work together. The business plan also identifies key sector-level metrics that will track the progress towards achieving the desired outcomes, as presented below.

1. Problem Statements & Market Barriers

a. Problem Statements

The residential sector has a unique set of barriers that inhibit the customer from achieving greater levels of energy efficiency. These barriers will be reduced by a complimentary, integrated set of program intervention strategies that will actively engaged the customer to tap into both stranded market and economic energy efficiency potential. SoCalGas has distilled these barriers into the following sector problem statements:

1. **Whole House retrofits are too costly for customers and the current program offering design is too cost-ineffective for ratepayer participation.** The current program, Home Upgrade, is very cost-inefficient in its current design. Within the 2013-2015 program cycle, the SoCalGas Whole Building Program constituted over \$17 million in program expenditures and has consistently achieved its savings targets, however, the cost-effectiveness is well below the cost-to-benefit ratio threshold.

⁴ “Market transformation is not a label that uniquely identifies certain energy efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees.” [A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel]

⁵ D.09-09-047, pp. 88-89.

2. **Low participation across residential sector, especially in the multifamily segment.** The multifamily segment presents a challenge within SoCalGas Residential EE portfolio. First, multifamily buildings vary widely in terms of heating, ventilation, and air-conditioning (HVAC) systems, building size, tenant incomes, finance structures and ownership structures - all significant factors that affect energy efficiency related decisions. These fragmented characteristics make the multifamily sector extremely diverse and thus require innovative energy efficiency strategies.

In addition, multifamily building ownership is not highly concentrated, which means more decision-makers must undertake the effort and be convinced before the building sector as a whole can reach its efficiency potential at scale. To that point, building owners with fewer properties may have less incentive to undertake the effort to understand the incentives, measures, and other relevant factors, or less staff available to assist them in doing so.

Further, under most multifamily unit leases, energy costs are paid directly by tenants and building owners are not driven to invest in efficient building systems. Conversely, in other forms of leases, building owners pay energy expenses and tenants have little incentive to save energy in their leased space. This dynamic is commonly referred to as the “split incentive” barrier to energy efficiency within the multifamily sub sector. Even when the barriers above are addressed there still exists the lack of capital issue, which many multifamily owners face. Some owners find it difficult to convince lenders of the association building expenses and energy efficiency upgrades. In addition, many owners may not have the credit or collateral to obtain secure financing options to implement energy efficient projects.

3. **EE gas equipment and appliance retailers withdrawing support for point-of-sale rebate program offering due to growing hassle costs.** The SoCalGas Plug Load and Appliance (PLA) Point of Sale (POS) program has been very successful over the past several years. Early program participation from the retailers showed POS representing about 11% of the PLA energy savings. The POS program has grown to 78% of the PLA portfolio as of 2015. Recently, the POS program has seen a decline in participating retailers. The reasons for declining retailer participation are due to retailer’s internal costs and costs for implementing the POS program. In the early stages of the POS program, the measures and retailer stock keeping units (SKUs) related to eligible measures were small enough for the retailers to manage. As the measure mix grew, so did the number of transactions and this has become costly, specifically, the costs to monitor and manage have increased substantially. Bar codes not matching eligible SKUs, invoicing of non-qualifying measures, and inability to track manual discounts resulted in financial losses which have become significant over time. Many of the large retailers are not willing to participate for these reasons.
4. **Diminishing returns and increasing costs are causing the residential new construction builder community not to pursue above code energy efficiency.** With the U.S. economy in a steady recovery, the housing market, which had been hit severely during the recession, is beginning to make a comeback. As the housing market recovers, new home construction demand is increasing, and so are costs. According to the Engineering News-Record, between March 2014 and February 2015, construction costs rose 2.9%, and for the previous 12 months rose 3.2% - far outpacing the meager U.S inflation rate of the previous years.⁶ While costs in every industry tend to increase slightly from year to year, there are additional factors affecting the construction market, causing a

⁶ Need to add reference

steady average price increase. Three main causes for rising construction costs include: rising material and transportation costs; competition for labor and tradespeople; and low mortgage rates.

b. Market Barriers

There are several market barriers present within the same market that inhibit the customer from achieving higher levels of energy efficiency. Market barriers are a byproduct of the market sector characteristics and the customer’s behavior within that specific market sector. Program strategies are temporary interventions introduced into the market sector to create real, lasting market changes.

The following are perceived market barriers, specific to the residential sector, identified during the business planning process. Typically, multiple barriers co-exist in the same market as summarized in the identified problem statements. Specific examples related to each market barrier are provided.

Table D.1: Perceived Market Barriers	
High First Cost	<p>Larger incentives required for whole building solutions. Whole home programs provide for deeper energy efficiency within the residential sector, however, significant ratepayer-funded (non-cost-effective) incentives are required to encourage customer to take action. During the first three years (2013-2015) of the residential EUCA Home Upgrade program, the program expenditures exceeded \$17 million. To reduce costs, SoCalGas co-delivers the program with SCE and two MOUs, which allow for program costs such as implementation fees and incentives to be shared. However, in instances where SoCalGas delivers the program without an electric utility, SoCalGas carries a large cost burden and thus program funds are not available to spread to a larger market potential.</p>
	<p>Whole home program design is very non-cost-effective. Incentives are provided to customers to overcome the high first cost market barrier. However, under the current application of the CPUC cost-effectiveness guidelines (i.e., dual-test), the current program, as designed, is not close to being cost-effective. A significant redesign of the current residential whole building offerings that relies on non-ratepayer financial support (e.g., financing) and/or a departure from current CPUC cost-effectiveness requirements is needed to make such an offering a worthwhile investment for the ratepayer. A recent increase in Home Upgrade job submittals demonstrates that recent utility program improvements have addressed participation requirements identified by CPUC evaluation studies. However, these tactical improvements do not address the cost-effectiveness issue of the whole building design.</p>
	<p>Rising residential new construction costs move builders away from above code EE. Due to higher new construction costs, homebuilders are not incorporating above code EE into new homes, thereby creating lost opportunities. As the housing market recovers from the 2008 economic recession, new home construction demand is increasing, and so are costs. While costs in every industry tend to increase slightly from year to year, there are additional factors affecting the construction market, causing a steady average price increase. Rising construction costs result from costs due to material and transportation; labor; and code compliance.</p>
Performance Uncertainty	<p>Mild climate, low energy costs deter large investments in EE. Lower cost of natural gas and southern California’s mild climate creates customer uncertainty to the value, both short and long-term, of EE investments. Also, equipment tends to last longer in southern California’s dry, mild climates, further impacting the customer’s uncertainty of the benefits in replacing working equipment.</p>

Table D.1: Perceived Market Barriers

	<p>Aggressive code resulting in lost EE opportunities. With the launch of 2013 Title 24 Building Energy Efficiency Standards, California Advanced Homes Program (CAHP) has experienced a substantial and consistent decline in enrollment and participation, creating EE lost opportunities. As Title 24 requirements become more rigorous, the builder community is moving away from attempting aspirational goals necessary to meet CAHP qualification thresholds and simply building to code. This is partially as a result of lower program incentives and whether the homebuyer will pay for the higher cost associated with above-code EE. As code requirements increase, the applicable benefit of the above code incentives decreases, thus causing longer payback periods for energy efficiency measures. Finally, recent code changes have allowed builders to opt for solar-ready building options in lieu of EE.</p> <p>Uncertainty regarding the future energy savings and bill reduction associated with changes in customer behavior. Uncertainty regarding the future customer and ratepayer benefit of changing customer’s energy consumption behavior has limited the deployment of program strategies designed to permanently modify customer energy consumption levels and patterns. Recognition of behavioral EE is an integral part of achieving both market and economic potential within the residential sector. There is also a concern regarding whether behavioral EE can be captured and recognized while reducing the hassle and/or transaction costs barrier for the customer. With a reliance on AMI usage data, energy savings resulting from behavioral and equipment retrofits are readily recognized. A policy change is needed to recognize and encourage behavioral EE in the residential sector while reducing the customer’s transactional costs associated with participation in more comprehensive energy efficiency efforts.</p>
<p>Diffused Market</p>	<p>Multifamily segment is very diverse. The multifamily buildings vary widely in terms of heating, ventilation, and air-conditioning (HVAC) systems, building size, tenant incomes, finance structures and ownership structures which are all significant factors that affect energy efficiency related decision-making. These fragmented characteristics make the multifamily sector extremely diverse in their decision-making and thus require innovative energy efficiency strategies. For example, multifamily building ownership is not highly concentrated, which means more decision-makers must undertake the effort and be convinced before the building sector as a whole can reach its efficiency potential at scale. Also, building owners with fewer properties may have less incentive to undertake the effort to understand the incentives, measures, and other relevant factors, or less staff available to assist them in doing so.</p>
<p>Access to Financing</p>	<p>Limited access to adequate capital in the multifamily segment. Many multifamily owners do not have access to capital to pursue EE retrofits. Many owners find it difficult to convince lenders of the relationship between energy savings and building expenses. In addition, many owners may not have the credit or collateral to obtain secure financing options.</p>
<p>Split (or misplaced) incentive</p>	<p>Difficult to influence EE decision-makers. Under most multifamily unit leases, energy costs are paid directly by tenants, therefore, building owners have no motivation to invest in efficient building systems. For some leases, however, building owners pay energy expenses and tenants have little incentive to save energy in their leased space. This barrier is not limited to multifamily. The single-family segment is experiencing a significant shift to renters in single-family housing. The split incentive barrier is also growing in the residential new construction area between the builder and future homeowner.</p>

Table D.1: Perceived Market Barriers

Hassle or Transactional Cost	<p>Retailers not willing to pay transactional cost for supporting EE purchases. Major retailers are withdrawing from point-of-sale (POS) program intervention strategies due to rising transactional costs. Retailer’s internal costs to support POS are rising. In the early stages of the POS program, the measures and retailers’ SKUs related to eligible measures were small enough for the retailers to manage. As the measure mix grew, so did the number of transactions, making it costlier to track, monitor and manage. Bar codes not matching eligible SKUs, invoicing of non-qualifying measures and inability to track manual discounts are resulting in large financial losses for retailers.</p>
	<p>Lower cooperation from building industry. Due to this rigorous ever-changing upward code, the hard-won cooperative relationship between the IOUs and builders has begun to erode. Builders become indifferent to above code savings due to the decrease in financial benefits and thus become indifferent to building relationships with IOUs. Furthermore, with curtailed CAHP enrollment, touchpoint (relationship based, less face-to-face) opportunities for IOUs to educate and influence energy efficiency decisions by builders are also diminishing.</p>

2. Desired Sector Outcome

A market effect is a permanent change in a market structure and/or market participant behavior that represents an increase in the adoption of EE products, services, or practices created by market interventions (i.e., program or government).⁷ The sector business plan identifies key milestones in the advancement towards a permanent market effect through a set of desired sector outcomes. In many cases, the desired outcome is expected well beyond the near and mid-term planning horizon, and ties to the 10-year vision for the sector. The business plan identifies the corresponding program intervention strategies that will be deployed to reduce the market barriers that will result in the desired sector outcome.

Table D.2: Market Sector Overview: Residential Sector

Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
Whole house retrofits too costly and program offering too cost ineffective for ratepayer, as currently designed.	High adoption of energy efficiency solutions of whole house gas EE solutions.	Increase the customer adoption of whole house gas EE solutions.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Customer Incentives • Direct Install • Financing • Homeowner Resale • Midstream EE Appliances • Whole Home 	Increase in number of customers adopting whole house gas EE solutions.

⁷ A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs, July 1996, Joseph Eto, Ralph Prael, and Jeff Schlegel, p. 9

Table D.2: Market Sector Overview: Residential Sector

Problem Statement	10-year Vision	Desired Outcome	Program Strategies	Sector Metric Type
Low participation across residential sector, especially multifamily segment.	High adoption of gas EE solutions across all residential segments, especially the multifamily segment.	Increase customer adoption of gas EE solutions, including behavioral-related actions, across all residential segments especially the multifamily segment.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Customer Incentives • Direct Install • Financing • Homeowner Resale • Midstream Appliances • Whole Home 	Increase in EE savings achieved in all residential segments, including the multifamily segment.
EE gas equipment and appliance retailers declining support for point-of-sale rebate program offering due to growing hassle costs.	High adoption of EE gas appliances in single-family and multifamily segments.	Increase adoption of EE gas appliances in single-family and multifamily segments.	<ul style="list-style-type: none"> • Partnering • Intelligent Outreach • Customer Incentives • Midstream EE Appliances 	Increase in EE savings achieved through gas appliance installations.
Diminishing returns and increasing costs are causing the residential new construction builder not to pursue above code EE.	High adoption of above code EE gas technologies into new homes.	Increase the amount of above code EE gas technologies into new homes to avoid lost opportunities.	<ul style="list-style-type: none"> • Partnering • Customer Incentives • Codes & Standards • Midstream EE Appliances 	Increase in EE savings achieved in residential new construction market.

Figure 1: Market Barriers & Program Intervention Strategies



Figure 2: Market Barriers & Program Intervention Strategies



Figure 3: Market Barriers & Program Intervention Strategies



Figure 4: Market Barriers & Program Strategies



3. Program Intervention Strategies

To realize the desired sector outcomes, several coordinated and integrated program intervention strategies will be deployed throughout the various market channels to increase customer EE adoption levels. This will support the achievement of increases in the adoption of EE products and behavioral practices. The expected outcome, corresponding sector metric, market barriers, and program intervention strategies are summarized below and grouped by the sector's problem statements. It is expected that these program strategies will be offered, in tandem, to the customer to enable freedom of choice based on the individual customer's preferences. To support an adaptive program portfolio, incentives levels will vary throughout a program's lifecycle in response to customer reaction or inaction (e.g., higher equipment costs, lower perceived EE-related benefits). A detailed description of each program strategy follows these summaries.

The residential sector, both single-family and multifamily segments, is generally characterized as follows:

- Very large number of residential accounts;
- Low natural gas consumption due to the region's mild climates;
- Trouble overcoming the high first cost to energy efficiency, especially for whole house solutions;
- Limited opportunities for natural gas energy efficiency; and
- A prolific split incentive barrier issue across all segments, including new construction.

Due to the limited natural gas usage among customers within this sector and the need to simplify customer engagement in the delivery of demand side management (DSM) programs, SoCalGas proposes to coordinate program delivery with local utilities (electric, water), where practicable. SoCalGas has no fewer than 18 municipal utilities operating in its territories, and also has overlaps with the other IOUs, which requires a specialized and concerted efforts to formulate and execute a program partnering and integration strategy. This will allow for a single, simple customer engagement and will empower the customer to implement a holistic energy (and water) efficiency plan.

The following is a comprehensive list of program intervention strategies that will be directed at SoCalGas' residential customer sector. The strategies are intended to overcome the various market barriers identified in this business plan to achieve permanent market effects. Upon Commission approval of this business plan, future implementation plans will be presented describing specific program approaches to implementing these program intervention strategies. Overall, the program intervention strategies are intended to:

- Facilitate, sustain, and transform the long-term delivery and adoption of energy efficient products and services for single and multi-family dwellings;
- Cultivate, promote, and sustain lasting energy-efficient behaviors by residential customers; and
- Meet customers' energy efficiency adoption preferences through a range of options from single-measure offerings through comprehensive whole house approaches.

Table D.3: Program Strategies by Customer Size: Residential Sector
Summary: Program Interventions Strategies Across Segments & New Construction

Intervention Strategies	Status	Single-Family	Multifamily		Mobile Home	New Construction	
			Small	Large		Single-family	Multi-family
Partnering							
• Utility Partnering	Existing	X	X	X	X		
• Industry Partnering	New	X	X	X	X	X	X
• Customer Partnering	New			X			
• Retailer Partnering	Existing	X	X	X	X		
Intelligent Outreach							
• Data Analytics	New	X	X	X	X		
• Virtual Engagement	New	X	X	X	X		
• Energy advisor	Existing	X	X	X	X		
• Energy Mgmt. Technology	New	X	X	X	X		
• Disadvantaged Community Outreach	New	X	X	X	X		
• Sharing EE Best Practices	New			X			
• Single Point-of-Contact	New	X	X	X	X		
• Outreach							
Homeowner Resale	New	X	X	X	X	X	X
Customer Incentives							
• Pay-for-Performance	New			X			
• New Construction Incentives	Existing					X	X
• Deemed Incentives	Existing	X	X	X	X		
• Contractor Incentives	New	X	X	X	X		
• Bundled Measures	Existing	X	X	X	X		
Direct Install							
• Low/No Cost	New	X	X	X	X		
• Comprehensive	New	X	X	X	X		
Financing	Existing	X	X	X	X		
Midstream EE Appliance	Existing	X	X	X	X	X	X
Whole Home	Existing	X	X	X	X		
Innovative Design	Existing	X	X	X	X	X	X
Crosscutting Coordination							
• Emerging Technologies	Existing	X	X	X	X	X	X
• Workforce Education Training	Existing	X	X	X	X	X	X
• Codes & Standards	Existing	X	X	X	X	X	X

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
Partnering				Limited-partnership arrangements, deployed on an as needed basis that is intended to: increase the number of customers adopting EE; promote deeper, comprehensive EE; simplify customer engagement; and reduce program costs through a cost-sharing partner model based on equitably sharing of customer incentives and administrative costs among partners.
• Utility Partnering	Existing	NR	Near, Mid-term	Facilitate the co-delivery of key program intervention strategies among gas and electric IOUs, publicly-owned utilities, program administrators, and water agencies.
• Industry Partnering	New	NR	Near, Mid-term	Partnering will also be deployed, on an as needed-basis, among industry associations to promote EE solutions to a represented customer group.
• Customer Partnering	New	NR	Near, Mid-term	Partnering with larger property owners to create EE action plans as part of the customer’s property management plans.
• Retailer Partnering	Existing		Near, Mid-term	Retailer support services will include store visits to provide PLA program training and reinforcement along with placement of promotional and marketing materials that highlight high efficiency products. Co-marketing opportunities with manufacturers and sales channel partners will be explored to facilitate customer access to energy efficiency information and services, helping customers identify participating program retailers and qualified local contractors. Marketing efforts will also promote tools to provide additional information on rebates, incentives and other energy efficiency opportunities.
Strategy: Intelligent Outreach				To assist customers in identifying the greatest EE opportunities, improve cost efficiency in program delivery, segment-specific benchmarking, and provide deeper, comprehensive energy savings solutions.

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Data Analytics 	New	NR	Near, Mid-term	Leverage AMI data to quickly and efficiently target homes (single-family and multifamily) with the highest EE potential per customer. This will assist in encouraging the uninterested customer with the opportunity for immediate and direct financial benefits by incorporating EE into their operations. Benchmarking by segment and size will be a key element to this strategy.
<ul style="list-style-type: none"> Virtual Engagement 	New	R	Near, Mid-term	With the use of data analytics, SoCalGas can provide energy assessments by way of virtual audits that recommend permanent behavioral actions to household decision-makers and property owners. Simple, low and/or no touch customer communications to provide energy assessment, on a repeated basis, will be leveraged to permanently change the customer's behavior. Energy usage alerts will be deployed to assist customers in managing their energy. The strategy will also deploy other tactics to leverage AMI data and to confirm actual delivery of expected energy savings from EE retrofits and behavioral actions. The strategy will also deploy other tactics to confirm actual delivery of expected energy savings from EE retrofits and behavioral actions.
<ul style="list-style-type: none"> Energy Advisor 	Existing	R	Near-term	Offers an integrated DSM audit delivered through mail-in and virtual environments that will be offered across the residential sector to identify EE opportunities. The energy advisory tactic will leverage data driven interactive tools designed to engage and motivate customers to reduce their energy consumption through personalized program recommendations. Energy advisor will also provide unbiased responses to customer questions regarding participation in various EE programs including the whole home strategy.

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Energy Management Technology 	New	R	Near-term	Leverages emerging management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and management technologies to permanently modify residential customer behavior, resulting in reliable EE savings. These technologies will also focus on appliances that can assist the customer to manage their energy, including proper maintenance of appliances (e.g., HVAC self-diagnostic technology) to achieve optimal efficiency. Where practicable, the strategy will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency experience.
<ul style="list-style-type: none"> Disadvantaged Community Outreach 	New	NR	Near-term	Coordinates residential energy efficiency sector and low income offerings to target and overcome unique barriers facing disadvantaged communities. This strategy will also include a multi-ethnic component that will deploy in language outreach efforts in to promote a better understanding of and increased participation in residential EE programs. Various program strategies will be bundled and enhanced (e.g., higher incentives, expanded direct install services, etc.) to achieve deeper energy efficiency among these communities. Unlike general awareness campaigns, this outreach strategy will leverage data analytics to identify customers with the highest EE potential in these communities so customers can benefit from immediate behavioral changes and act upon deep, comprehensive EE solutions over time.
<ul style="list-style-type: none"> Sharing EE Best practices 	New	NR	Near, mid-term	Offer, along with industry groups, a collaborative forum to help inform, excite and accelerate EE actions among like customers (e.g., multi-family property owners).

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Single Point-of-Contact Outreach 	New	NR	Near-term	<p>An EE concierge service to integrate program offerings for multifamily property owners. Through data analytics and partnering arrangements with property owners, the strategy targets multifamily buildings with higher EE potential and assists property management and in-dwelling customers with participation in all applicable program offerings including multifamily energy efficiency, middle income direct install, whole home and low income energy efficiency offerings. Technical services will also be provided for larger, more complex EE projects.</p>

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Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
Homeowner Resale	New	NR	Near, mid-term	<p>Works with the real estate community, homeowners, and multifamily property owners (including new construction) to promote the advantages of purchasing an energy efficient home (single-family and multifamily). The strategy will leverage the unique market position of the real estate community to promote the EE characteristics of homes in the resale market. A significant amount of home improvement spending occurs during the initial years of homeownership. Providing information to key actors (e.g., homebuyer, home seller, agent, etc.) throughout the home search and purchase process will help spur EE investments by current and future homeowners. The strategy will also inform existing homeowners on the potential benefits of pursuing whole house approaches, including increased home value, throughout the ownership lifecycle.</p> <p>Key elements of this strategy include: (1) support for a standardized energy performance rating system to promote the resale of EE homes; (2) encourage use of third party certifiers to confirm home is energy efficient; (3) partner with real estate community to include home energy efficiency rating (e.g., searchable green fields) in multiple listing services (MLS) to inform potential homebuyers; (4) encourage the use of certified green appraiser to properly evaluate a home’s EE features; and (5) leverage data analytics to employ comparative and benchmarking approaches to identify energy efficient homes. Ultimately this will result in reduced data collection burden, immediate awareness to home seller, and a low-touch service to allow home seller to directly share their EE home rating on MLS.</p>

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
Customer Incentives				Facilitates customer choice by offering a simplified suite of financial incentive strategies to customers to reduce the high first cost barrier, the key market barrier for most customers. Although incentive-based strategies like pay-for-performance may appeal to larger residential EE projects, in many circumstances, the one-payment incentive approach is very effective in motivating the customer to install EE equipment. The following strategies will be offered in combination with other program strategies to encourage deeper, more comprehensive EE solutions and permanent EE behavior modification.
<ul style="list-style-type: none"> Pay-for-Performance 	New	R	Near-term	Targets more comprehensive EE projects in the residential multi-family segment by offering a performance-based whole building approach. Where there are significant EE savings opportunities, customers will be encouraged to participate in a pay-for-performance (P4P) strategy and to leverage the energy service provider community. The P4P strategy will provide for incentive payments to the participating customer over a pre-determined period, on preset payment intervals based on installation activities, measured savings, and using normalized meter data, with a baseline of existing conditions.

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Residential New Construction Incentives 	Existing	R	Near-term	<p>Offers a comprehensive approach focused on energy efficient, sustainable design and construction, green building practices, and promotion of emerging EE technologies. Through a combination of education, design assistance and financial support, the strategy works with building and related industries to exceed compliance with California Code of Regulations, Title 24, Part 6, Building Energy Efficiency Standards for Residential and Nonresidential Buildings (Standards), to prepare builders for changes to the Standards and to create future pathways beyond compliance and traditional energy savings objectives. Participation is open to single-family as well as low-rise and high-rise multifamily residential new construction. To encourage builders to design and construct homes with above-code energy efficiency, the strategy will accept partial single-family and multifamily low-rise project enrollments. To promote ZNE and ZNE-ready design and construction, the strategy will include premium incentives to encourage early adoption of residential ZNE homes.</p>
<ul style="list-style-type: none"> Deemed Incentives 	Existing	R	Near-term	<p>Offers financial incentives based on predetermined (a.k.a., deemed) energy savings. It also features rebates per unit measure for installed energy-saving projects and provides the IOU, equipment vendors, and customers a simple transaction and encourages greater market adoption of emerging EE technologies and applications. For example, the strategy will aggressively promote emerging energy management technologies that incents customer to efficiently manage gas along with electric and water. Deemed incentive strategy will also work with retailers, where possible, to deliver rebates to customers at the point-of-purchase and/or to inform customers at the point-of-sale of the benefits of purchasing EE appliances along with the availability of rebates.</p>

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Contractor Incentives 	New	R	Near, mid-term	Encourages a greater number of qualified contractors to actively promote and properly install energy efficient measures by offering incentives directly to contractors. To promote awareness and to increase the number of qualified contractors, an outreach component will also be offered in collaboration with industry associations (through a partnering strategy). The contractor incentives will be coordinated with various residential program strategies (e.g., industry partnering) that rely on the general contractor community (e.g., multifamily, whole home, etc.). This will support the eventual desired market effect of a self-sustaining contractor community that will promote, install and maintain EE equipment for residential customers.
<ul style="list-style-type: none"> Bundled Measures 	Existing	R	Near-term	Provides an integrated approach of bundling various measures together to provide an all-inclusive solution to the customer based on customer profile (segment, size, energy usage) primarily for multifamily buildings. The bundled strategy will provide a simple, easy customer transaction that will integrate education, financing, and technical assistance in support of EE installations.
Direct Install				Offers a standard direct install (DI) approach for all residential segments with a special focus on disadvantaged communities including moderate income households that will deliver natural gas and electric energy efficiency solutions, in a simple approach, to achieve near-term measurable EE benefits. The strategy will coordinate with the SoCalGas' low income energy efficiency program. To achieve deeper levels of EE, the DI strategy will also extend beyond a standard list of limited low/no cost EE measures by offering a comprehensive direct install tactic. The comprehensive offer relies partially on ratepayer funds and on a customer co-payment. The co-payment contribution can be achieved by leveraging other funding sources such as alternate financing strategies (e.g., PACE loans).

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Standard Direct Install (DI) 	New	R	Near-term	The standard direct install offering will provide limited list of low/no cost EE measures. DI will install natural gas EE measures along with other similar electric and water efficiency measures, where practicable. It can be combined with the intelligent outreach strategy to identify residential properties with the greatest EE opportunity.
<ul style="list-style-type: none"> Comprehensive DI (CDI) 	New	R	Near-term	Encourages deeper energy savings by offering more comprehensive EE measures that are typically used by the targeted customer segment. CDI will provide qualified contractors that will engage directly with the customers to install measures. A co-pay option will be offered to the customer to offset the initial cost of the EE equipment. Customers can leverage alternate financing (e.g., PACE) to fund their co-pay portion. The DI strategy will also encourage property owners/managers of multifamily properties to install efficient energy efficient measures and appliances.
Residential Financing	Existing	NR	Near-term	The strategy will promote the American Recovery and Reinvestment Act (ARRA)-funded Property Assessed Clean Energy (PACE). PACE financing offers another avenue for the multi-family property owners within the City of Los Angeles to fund EE, renewable energy, and water-saving improvements on-site. PACE financing is repaid twice a year through an assessment on the property taxes. Financing is tied to the property through the property tax system, and if the property is sold, the repayment obligation transfers to the new owner. PACE financing can fund up to 100% of the project's installed costs, eliminating the need for upfront capital for the project. Also, the strategy will promote other financing offerings such as the Green Preservation Plus financing program, developed by the Federal Housing Administration (FHA) and Fannie Mae to increase EE in multifamily Housing. The strategy will also educate and drive home contractors to participate in the promotion of on-bill repayment offerings (e.g., Residential Energy Efficiency Loan Assistance Program).

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
Midstream EE Appliance	Existing	R	Near-term	The strategy provides midstream deemed incentives to lower the wholesale price of common natural gas EE equipment (e.g., tankless water heating, natural gas furnaces) in collaboration with local distributors. This offering will be coupled, where practicable, with a comprehensive, co-pay direct install strategy that can efficiently deliver on-demand installation by trained and qualified contractors. If practicable, the strategy will also work with manufacturers to draw down the wholesale cost of EE appliances, to encourage installation of the most efficient appliances (in recognition of federal preemption or lower cost effectiveness) and to incorporate load management devices, software and other approaches to reduce standby consumption. The strategy will also work with retailers to improve their stocking habits and with distributor and/or manufacturing-funded rebates/discounts, where possible.

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Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
Whole Home	Existing			The strategy will be delivered as part of an overall simple, seamless offering with other SoCalGas whole house program strategies (e.g., partnering with key market actors, data analytics-based outreach, etc.), including other DSM solutions (e.g., demand response, low income energy efficiency, customer generation, etc.). The achieved long-term effects will result in a self-sustaining market that naturally drives the customers, contractors and other key market actors towards a whole home path EE solution. The incentive component will offer a simplified incentive that uses a holistic approach to identify and correct comfort and energy-related deficiencies in single-family detached homes and multifamily buildings. The strategy will promote long-term energy benefits through deep EE retrofits, including building shell upgrades, high-efficiency HVAC units, heating and cooling systems, hot water heating, and other deep energy reduction opportunities. To capture greater level of energy savings, the program strategy will place an added emphasis on targeting inland climate zones. The strategy will also coordinate with the energy advisory hotline (see, Intelligent Outreach) where customers can receive unbiased answers to their Home Upgrade questions from their trusted utility energy advisor as well as an explanation of the whole house performance theory.
Innovative Design	Existing			The strategy will solicit for large budget program designs to reach deeper levels of energy efficiency. The solicitations will be continuously offered through the Innovative Design for Energy Efficiency Application (IDEA365) solicitation in a continuous search for ways to capture EE savings in various segments within the sector.
Crosscutting				
Emerging Technology Introduction				Actively introduce EE technology solutions that will be applicable to the customer sector and achieve customer adoption.

Table D.4: Program Intervention Strategies - Descriptions				
Strategy	Status	Type	Timing	Descriptions
<ul style="list-style-type: none"> Scaled Field Placement 	Existing	R	Near, Mid-term	Deliver scaled field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable residential customers.
<ul style="list-style-type: none"> Demonstration Field Placement 	Existing	NR	Near, Mid-term	Conduct selective demonstration field placement of new and/or renewed EE technologies to demonstrate viability and applicability to targeted customer segment(s) for larger promotion to all applicable residential customers.
Codes & Standards	tbd	NR	Near, Mid-term	C&S will work with the residential sector customers and contractor community to increase awareness of new codes and to support code compliance.
Workforce Education & Training	tbd	NR	Near, Mid-term	WE&T will provide classes, seminars, consultations, and demonstrations to support residential contractor training and awareness of EE technologies, quality installation and code compliance. WE&T will also assist residential multi-family property owners (and their staffs) by providing technical education and/or in-field training to help property owners convert interest into EE actions.

Note: R=Resource; NR = Non-resource

4. Program Delivery

Individual programs will be designed and delivered by third-party providers and SoCalGas based upon the program intervention strategies presented in the residential sector business plan. Some programs will be designed and delivered through a statewide program implementer under contract by a lead program administrator. Other programs will be designed and delivered by third party implementers at a local or regional level. In some cases, SoCalGas will leverage its natural position with its customers to effectively deliver programs. Also, SoCalGas will support the program delivery by leveraging existing resources (customer account representatives) to assist the customer and third-party program implementer in the identification and implementation of specific customer projects. During the transition to new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market for a limited time.

a. Statewide Implementation

SoCalGas will collaborate and coordinate with other program administrators on the effective implementation of statewide program offerings. Programs designed to engage directly with specific market actors at the midstream and upstream market channels will be implemented on a statewide basis. Other downstream programs, beyond what is presented in the business plan, may also be considered candidates for statewide implementation throughout the duration of the business plan.

b. Third party Implementation

Local and regional solutions are necessary for the achievement of the residential sector vision, goals and objectives. Many of the current programs offered are done so in coordination with publicly-owned utilities (POUs). Such collaborations with POUs will continue at a local level. For example, SoCalGas has a strong partnership with the Los Angeles Department of Water and Power (LADWP), the largest municipality in the nation, to jointly design and deliver EE programs to a shared customer base. Such activities will continue whether implemented by the POU and/or implemented by a SoCalGas selected and managed third-party program implementer(s). SoCalGas will also work with other POUs to identify good program candidates to join the statewide implementation efforts, where feasible.

c. IOU Implementation

SoCalGas proposes to continue implementation of certain downstream programs (i.e., programs delivered directly to the customer) where it is reasonable and practicable to do so. SoCalGas will also continue to actively support the delivery of third-party programs. For example, customer services such as incentive payments and inspections, will be provided to support third-party program implementers and safeguard ratepayer funds. At times, it is more efficient and productive to leverage the natural relationship between SoCalGas and its customers. As the trusted energy advisor, SoCalGas has an ongoing relationship with its customers on all energy matters, including energy efficiency. SoCalGas proposes to continue to promote energy efficiency programs to the customers and customer groups in order to improve the likelihood that customers will adopt energy efficiency. SoCalGas will also continue to seek partnerships with other utilities and public agencies in its delivery of programs and services, including third-party implemented programs, to minimize program costs and maximize customer participation.

5. Performance Sector Metrics

To gauge sector progress towards the achievement of the desired sector outcomes, the business plan proposes key sector-level metrics. To properly monitor progress, the metrics will rely on data currently collected, tracked and verified as part of the program administrator's data requirements (e.g., energy savings, customer participation, etc.). This approach improves the accuracy and timeliness of metric tracking while keeping the monitoring costs to reasonable levels. The residential sector metrics associated with each problem statement are provided in Appendix A.

6. Key Partners

The success of the residential sector business plan will rely on a positive, collaborative relationship with a number of market actors, program administrators, regulators and other government entities. Below is a list of key partners that will help SoCalGas successfully achieve the ambitious vision for the residential sector.

Table D.5: Key Partners	
Key Partners	Support Activity
Program Administrators	<ul style="list-style-type: none"> • Deliver dual-fuel programs to reach more customers; • Leverage all available best practices and promote statewide consistency, where appropriate; • Simplify program engagement; • Capture all EE benefits including operational energy savings; and • Conduct market research that will identify and better understand unique barriers to energy efficiency investments.
Publicly-owned Utilities (POUs) and Water Districts	SoCalGas will actively coordinate with POUs and water agencies to effectively and efficiently deliver energy and water efficiency programs. SoCalGas will engage in partnership and co-delivery arrangements with POUs and water agencies when there is a shared customer base (gas and electric) to simplify the customer engagement and achieve higher levels of EE. SoCalGas will actively coordinate with POUs and water agencies throughout California and other regions to share best practices in program administration, design, and delivery.
State and federal agencies	SoCalGas will work with state and federal agencies to promote greater levels of EE adoption throughout the residential segments.
California Public Utilities Commission and Key Stakeholders	SoCalGas will work with the Commission and other key stakeholder to investigate ways to simplify program requirements and to identify policies that will recognize all energy efficiency benefits associated with residential sector EE programs.
Third-party Program Implementers	Solicit new and innovative programs from third-party program implementers to address the residential sector. Leveraging third-party programs allows program administrators to draw upon creative program solutions that can be quickly and effectively targeted to these customers. Continued collaboration with program implementers throughout the program’s lifecycle will be an integral part of the program’s success.
Industry Associations	Leverage and partner, when appropriate, with industry associations (e.g., property management companies, building associations, etc.) to increase program participation and achieve higher EE adoption levels with the residential sector.
Equipment Vendor and Manufacturers	SoCalGas will actively work with equipment vendors and manufacturers to promote greater adoption of EE equipment among the various residential segments.

E. Statewide Program Coordination

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and very collaborative, on-going relationship among all program administrators and implementers. A detailed discussion will be presented in the final business plan, which will include a process by which administrators will consult and collaborate among each other to ensure effective statewide implementation across all service territories.

F. Crosscutting Sector Coordination

1. Local Marketing and Statewide Marketing, Education & Outreach Integration

The sector programs will rely on a combination of statewide Marketing, Education, and Outreach (ME&O) efforts and targeted promotion of specific energy efficiency programs tailored to the various segments throughout the sector. There will be a focus on customers with higher EE potential, identified through data analytics, to encourage greater customer investment in energy efficiency opportunities.

Since the statewide Marketing, Education, and Outreach (ME&O) program's short-term goal is focused on the mass market customer (i.e., residential and small business owners) the residential sector will rely on the statewide ME&O program to inform residential customers of the importance of energy efficiency, their opportunities to act, and the benefits of their actions. In order for the customer to take action, local promotion will target key customer groups to inform them how to participate in EE program offerings. SoCalGas will actively participate in the both the development of the five-year ME&O Strategic Roadmap and Annual Joint Consumer Action Plans to coordinate program offerings with the statewide marketing efforts and to support the short and long-term goals of the ME&O program.

2. Workforce Education & Training Integration

The Workforce Education & Training (WE&T) is well positioned in its role of facilitating training on the skills needed by the workforce to perform the type, level and quality of work to reduce energy consumption and achieve the energy savings targeted by the State. WE&T will provide classes, seminars, consultations, and demonstrations to support training programs to promote quality installation, code compliance, and new technology adoption. WE&T will also assist property owners (and their staffs) by providing technical education and/or in-field training to help the customer convert interest into EE actions.

3. Emerging Technologies

The residential sector program offerings will coordinate with the Emerging Technology program (ETP) to provide for a greater examination and market adoption of emerging and existing technologies to capture natural gas energy efficiency opportunities in the residential sector. The residential sector program will coordinate with the ETP to support market introduction of new and existing but underutilized technologies to the market, on a limited scale, through: technology-focused third party pilot programs, customer demonstration, and market studies. Such technologies may include energy management technologies for whole building applications.

In the residential sector, some of the largest opportunities for savings are in mass-market programs that have a low per-intervention cost, specifically behavior, upstream, and performance-based programs. The statewide ETP will continue to support these types of measures in a number of ways. Additional ETP activities in this sector include exploring new behavioral solutions and helping to implement new policies, such as AB 802, SB 350, SB 793 and ZNE efforts.

On the behavior front, the ETP continues to explore solutions that provide customers with detailed information on energy use, facilitate enhanced demand response activities, and boost energy and savings through the use of apps. This is still an emerging field, so ETP—in tandem with other utility and industry stakeholders—seeks to increase utility understanding of solutions in this space while investigating options that result in persistent energy savings.

The ETP has identified a goal of working with product developers to integrate energy-saving attributes in the product design phase. Additionally, using other beneficial attributes of widgets can be the primary driver of market adoption. This is useful when working upstream, as it means that energy does not need to be the top customer consideration; it can simply be a “bonus” feature of a product that also offers security, comfort, or a boost in productivity.

The statewide ETP is also monitoring the evolution of connected technologies within the home. California SB 793 stipulates that at least one such technology must be included in DSM portfolios and ETP has provided support in identifying and analyzing candidate products. As connected appliances continue to proliferate, the ETP will monitor this industry and will look for individual technologies and suites of products that are an appropriate fit for DSM portfolios.

Other pieces of legislation the ETP is helping to implement include SB 350, which doubled existing EE goals; AB 802, which includes “to-code” improvements for underperforming multifamily buildings, facilitates enhanced access to energy use data, and paves the way to meter-based savings; and California’s ZNE efforts, which apply all new residential constructions by 2020 and will include new IDSM solutions. The ETP will continue to evaluate products, hold demonstrations, identify barriers, and generate data that support these mandates while delivering positive results for customers.

4. Codes & Standards

The Statewide Codes and Standards (C&S) Program saves energy on behalf of ratepayers by influencing standards and code-setting bodies, such as the CEC and the Department of Energy (DOE), to strengthen EE regulations by improving compliance with existing C&S. The C&S Program will work with the residential sector customers and contractor community to increase awareness of new codes and to support code compliance. The C&S effort will also draw upon the practical knowledge of the contractor community in the early stages of code development. C&S will also assist in the development of ZNE retrofit design tool kits to advance ZNE retrofits in residential buildings.

5. Other DSM Program

To assist customers in managing their energy, the program strategies presented in this business plan will be coordinated and integrated with other customer demand-side opportunities, where feasible.

a. Integrated DSM

The integrated Demand-side Management (IDSM) encourages the integration of a full range of DSM options such as energy efficiency, advanced metering, low-income energy efficiency, distributed generation, alternate fuel vehicles. SoCalGas will continue identifying, designing, developing, and incubating new program partnering and integration ideas and opportunities with its peer utilities. It will also continue maintaining successful energy and water efficiency offerings that it operates jointly with various municipal utilities. SoCalGas and its implementers will continue maintaining a close working relationship with the program staffs at other utilities, as well as ensuring that all aspects of joint program operations, such as reporting and billing, remain at the highest standard. Having a smooth and positive working relationship with the staffs other the other utilities allows both SoCalGas and the other utilities to build confidence and continue expanding partnering and integration opportunities.

The internal integration of SoCalGas’ residential strategies will include building relationships outside of its EE, for example, the Energy Savings Assistance Program and Solar Thermal Program, will be targeted as market actors that will offer the greatest return on investment, primarily for residential homebuilders

and multifamily property owners. These market actors control a significant portion of the residential market, and their decisions can affect the future direction of energy efficiency in a large number of homes in California. By investing the resources to target and influence these decision-makers, IDSM efforts aim to steer these homes and their communities toward meeting the objectives of California’s energy efficiency strategic plan.

b. Demand Response

The residential sector business plan proposes to leverage emerging energy management technologies to assist customers in actively managing their energy remotely. This will include merging AMI technology with advanced energy efficiency and energy management technologies to permanently modify customer behavior which will result in reliable energy efficiency savings and serve to support utility demand response activities. Where practicable, these efforts will also partner with electric and water agencies with AMI technologies to provide a simple, one-touch efficiency and demand response experience.

c. Residential Rate Reform

Natural gas residential customers are not being considered for rate reform. As a result, this EE business plan does not address this topic.

d. Integrated Demand Side Resources

[Pending]

e. Alternate Fuel Vehicles

To advance the use of alternate fuel vehicles in California, Senate Bill 350 states the following goal: “Advanced clean vehicles and fuels are needed to reduce petroleum use, to meet air quality standards, to improve public health, and to achieve greenhouse gas emissions reduction goals.”⁸ The residential sector business plan proposes to increase awareness of alternative fuel vehicle options to single-family residential customers, new construction builders and residential property owners to significantly reduce nitrogen oxides (NOx) and greenhouse gas (GHG) emissions. Consistent with SB 350’s goals to address barriers to access for low-income customers to zero-emission and near-zero-emission transportation options,⁹ outreach efforts directed at disadvantaged communities will also emphasize the benefits and opportunities for alternate fuel vehicles supporting the residential sector.

f. Energy Savings Assistance (Multifamily)

The Energy Savings Assistance (ESA) program supporting the multifamily segment will be coordinated with the Residential energy efficiency business plan. The Single Point-of-Contact (SPOC) will serve as the primary conduit between the residential EE sector program offerings and the ESA program. The Disadvantaged Outreach efforts will be coordinated with local ESA outreach to increase energy efficiency adoption levels among all residential segments. The SPOC will also coordinate new strategies with the low income property owners such as residential financing (e.g., REEL) and the Homeowner Resale strategy.

⁸ Public Utilities Code § 740.12(a)(1).

⁹ See SB 350 (Statutes 2015, Chapter 547), at Section 7. See CAL. PUB. UTIL. CODE §25327(d).

g. Sourcing

Sourcing for the program intervention strategies will call upon the innovative proposals of the EE program implementer community and the unique market position of the utility. Specific programs will be designed and delivered in the appropriate market channel by third party implementers. The scope of the request for proposals for programs will be guided by the adopted program strategies represented in this business plan. SoCalGas will collaborate with selected third party implementers on program design to increase the likelihood of success and integration with other energy efficiency strategies within the portfolio.

To maintain current efficiencies and avoid customer confusion and frustration, key customer services, in support of the energy efficiency portfolio, will be maintained by SoCalGas. These customer services include: customer representatives to promote EE programs; processing customer rebate payments for downstream programs; project engineering reviews; program inspections; utility website to promote and receive customer requests for participation; and managing customer requests/complaints.

Consistent with a key principle of the EE rolling portfolio to promote a healthy and vibrant EE ecosystem in California, for both large and small providers, SoCalGas will release a series of competitive solicitations, on annual basis, to allow for continuous opportunities for the EE service provider community and to encourage ongoing innovation within the EE portfolio. SoCalGas plans to launch the first set of program solicitations in 2017 in expectation of Commission approval of the energy efficiency business plan application. The following provides the solicitation plan for the residential sector through 2020:

Program Strategy	Program Tactic	RFP Release Date	Implementation Date
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD

h. EM&V Considerations

The residential sector consists of two primary segments with varied characteristics. The following are recommendations to improve the body of knowledge regarding the residential sector.

The residential customer can benefit greatly from permanent changes to their energy consumption practices. For instance, there are several operational changes that can have a great impact on the amount of energy consumed by residential sector. Estimating the impact of behavioral measures will be paramount to the near and long-term success in achieving the overall goal of the residential sector.

The following are recommendations to improve the body of knowledge regarding the residential sector.

Market Research and Process Evaluation:

- Conduct a market study to examine the unique characteristics of the segments and trends within their specific segment or sub-segment.
- Survey residential customers to identify where program participation process can be simplified.
- Conduct market study on disadvantaged communities to identify unique market characteristics, market barriers, and customer preferences and energy habits.
- Perform additional research on the whole home market and key market actors to identify elements for encouraging deep, comprehensive whole home upgrades.
- Assess the emerging energy management technologies to identify potential energy efficiency applications.

Load Impact:

- Use normalized metered energy consumption data to determine the overall impact of O&M and behavior measures as an enhanced approach to quantify energy savings. For this approach, energy savings are calculated as the difference between the normalized metered energy consumption for baseline and post-intervention time periods.

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Appendix A: Sector Metrics

Energy Efficiency Business Plans: Sector Metric Table - Residential Sector									
Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10 years)
1. Whole House retrofits too costly and program offering too cost ineffective for ratepayer, as currently designed.	Residential energy use will be transformed to ultra-high levels of energy efficiency. All cost-effective potential for energy efficiency will be routinely realized for all residential properties and will fully integrate with other customer demand-side management options including clean renewables,	1. Increase the customer adoption of whole house gas EE solutions.	Partnering Intelligent Outreach Customer Incentives Direct Install Financing Homeowner Resale Midstream EE Appliances	Number of customers adopting whole house gas EE solutions.	2015 Participation Levels.	Program tracking data	Increase the number of whole house gas EE solutions by 15% over 2015 levels by Year 3.	Increase the number of whole house gas EE solutions by 35% over 2015 levels by Year 7.	Increase the number of whole house gas EE solutions by 50% over 2015 levels by Year 10.
2. Low participation across residential sector especially multifamily segment.		2. Increase customer adoption of gas EE solutions, including behavioral-related actions, across all residential segments especially the multifamily segment.	Partnering Intelligent Outreach Customer Incentives Direct Install Financing Homeowner Resale Midstream EE Appliances Whole Home	Amount of gas EE savings achieved in all residential segments including the multifamily segment.	2015 Participation Levels.	Program tracking data	Increase gas EE savings in multifamily sub-segments by 5% over 2015 levels by Year 3.	Increase gas EE savings in multifamily sub-segments by 15% over 2015 levels by Year 7.	Increase gas EE savings in multifamily sub-segments by 35% over 2015 levels by Year 10.
3. EE gas equipment		3. Increase adoption of EE	Partnering Intelligent	Amount of EE savings	2015 Participation	Program tracking	Increase EE savings in	Increase EE savings in	Increase EE savings in

Energy Efficiency Business Plans: Sector Metric Table - Residential Sector

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10 years)
and appliance retailers withdrawing support for point-of-sale rebate program offering due to growing hassle costs.	on a site-specific basis.	gas appliances in single-family and multifamily segments.	Outreach Customer Incentives Midstream EE Appliances	achieved in gas appliance installations	Levels.	data	home gas appliances by 5% over 2015 levels by Year 3.	home gas appliances by 15% over 2015 levels by Year 7.	home gas appliance by 25% over 2015 levels by Year 10.
4. Diminishing returns and increasing costs are causing the residential new construction builder community not to pursue above code energy efficiency.		4. Increase the amount of above code EE gas technologies into new homes to avoid lost opportunities.	Partnering Customer Incentives Codes & Standards Advocacy Midstream EE Appliances	Amount of gas-related EE achieved in residential new construction market.	2015 Participation Levels.	Program tracking data	Increase gas EE savings from residential new construction by 15% over 2015 levels by Year 3.	Increase gas EE savings from residential new construction by 15% over 2015 levels by Year 5.	

Appendix B: Applicable Legislation and Regulatory Directives

Appendix B: Applicable Legislation		Program Intervention Strategies
SB 350	§399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive certifies that the improvement or installation has complied with any applicable permitting requirements and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.(2) This subdivision does not imply or create authority or responsibility, or expand existing authority or responsibility, of a public utility for the enforcement of the building energy and water efficiency standards adopted pursuant to subdivision (a) or (b) of Section 25402 of the Public Resources Code, or appliance efficiency standards and certification requirements adopted pursuant to subdivision (c) of Section 25402 of the Public Resources Code.	Customer Incentives, Midstream Appliance, Direct Install, Whole Home
	§399.4 (c) The commission, in evaluating energy efficiency investments under its existing statutory authority, shall also ensure that local and regional interests, multifamily dwellings, and energy service industry capabilities are incorporated into program portfolio design and that local governments, community-based organizations, and energy efficiency service providers are encouraged to participate in program implementation where appropriate.	Direct Install, Whole Home
	§399.4 (d) In updating its policies, the commission shall, at a minimum, do all of the following:	
	(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.	Intelligent Outreach, Customer Incentives, Direct Install, Financing, Midstream Appliances, Whole Home
	(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.	Customer Incentives – P4P, Whole Home
(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.	Intelligent Outreach	

Appendix B: Applicable Legislation		Program Intervention Strategies
	(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results.	Customer Incentives, Whole Home
AB 793	§717(3)(b) “Energy Management Technology” may include a product, service, or software that allows a customer to better understand and manage electricity or gas use in the customer’s home or place of business.	SEM, Intelligent Outreach
AB 758 (EE Building Action Plan)	1.3.1- Home Energy Rating System (HERS) II Using the HERS II Rulemaking process and modifying the HERS II whole-house assessment protocols to align with current home upgrade program practices and other relevant industry protocols.	Whole Home
	1.3.2 - Minimum Standards for Smart Meter Data Analytics Establish minimum qualification standards and evaluation protocols for eligible low- and no-touch home energy assessment tools.	Intelligent Outreach
	1.5.1 - Improve Clarity and Ease of Use Develop approaches to simplify implementation of Building Efficiency Standards (BES) for existing buildings by unifying definitions with industry practice, by clarifying code requirements, and through the use of expert systems or other navigation tools.	Codes & Standards
	1.5.3 - Training and Communication Enhance communication, education, and interactions with local governments to ease compliance with and enforcement of the standards. Develop effective consumer communication materials to market non-energy benefits of compliance.	Codes & Standards
	1.6.3 - Advocacy and Technical Support Support enhanced federal standards and participate in proceedings of the federal government and neighboring countries (Mexico, Canada).	Codes & Standards
	1.6.5 - Plug-Load Management Programs Develop, encourage, and offer incentives for turnover of existing stocks and use of plug-load management devices and software and novel approaches to reduce standby consumption.	Intelligent Outreach (EMS), Midstream Appliance
	1.6.6 - Specification Development In some cases, new appliance standards cannot be adopted because of federal preemption or application-specific cost-effectiveness. Develop purchasing and replacement guidelines for products where large savings opportunities exist, but new standards cannot be adopted.	
	1.6.7 - Purchase Agreements Use large organization purchasing power to increase the efficiency of equipment and devices (lighting, appliances and so forth) used by employees and/or renters. State and local government procurements and low-income programs will focus on high-efficiency products. Promote adoption of such purchase agreements by managers of large multifamily property portfolios.	Midstream Appliance, Direct Install

Appendix B: Applicable Legislation	Program Intervention Strategies
<p>1.8.2 - Market Transformation Program Portfolios Evolve the energy efficiency program portfolios to focus more explicitly on market transformation activities in the upgrade marketplace.</p> <ol style="list-style-type: none"> 1. Understand the phenomenon of code shortfall in existing buildings, and mobilize projects to close any gaps. 2. Revisit administration of market transformation efforts. 	All
<p>2.1.2 - Benchmarking Data Infrastructure Map meters to physical buildings and upload whole-building consumption data to Portfolio Manager, as needed.</p>	Intelligent Outreach
<p>2.1.3 - Easy-to-Access Data and Analytics Provide simple, standardized access to customers and their chosen service providers so they can easily understand their real-time energy use and assess needs. Develop solutions for multifamily buildings, particularly low-income and commercial buildings, including provision of regular and frequent building-level usage reports. Allow consumers to share/donate their data for consideration of possible EE upgrades.</p>	Intelligent Outreach
<p>2.2.1 - Enhanced Program Design and ME&O Transition to more multifaceted, incremental, and performance-oriented efficiency programs.</p> <ol style="list-style-type: none"> 1. Incorporate all end-use energy sources, including water, plug loads, pools, irrigation, and exterior uses, into programs. 2. Incorporate trigger points to help reach consumers at key transaction points. 3. Establish behavior and operations as central elements impacting building energy consumption by incorporating them into programs, tracking, and evaluating. 4. Use ME&O to create a path that can connect consumers across programs and bundle actions based on their needs. 	Partnering, Intelligent Outreach, Customer Incentives, Direct Install, Financing, Midstream Appliance, Whole Home
<p>2.2.2 - Expand Behavior Programs Leverage current and expected innovations made possible with access to AMI data; plan and implement behavior programs with expanded scope and market reach.</p>	Intelligent Outreach
<p>3.1.1 - Sustainable and Effective Program Delivery Enhance program portfolios to reduce transaction costs and dramatically increase effects in hard-to-reach sectors.</p> <ol style="list-style-type: none"> 1. Streamline program requirements and operational procedures. Expand statewide programs with uniform designs. 2. Improve and expand direct-install programs for hard-to-reach populations. 3. Develop and implement new program designs for small and medium commercial and multifamily buildings. 4. Implement rolling program portfolios to solidify long-term funding commitments that align with business investment decisions. (Align with Strategy 1.9.) 	Intelligent Outreach, Disadvantaged Community Outreach, Customer Incentives, Direct Install, Whole Home

Appendix B: Applicable Legislation		Program Intervention Strategies
<p>3.2.1 - Performance Assurance Confirm energy savings outcomes using performance-based validation methods.</p> <ol style="list-style-type: none"> 1. Develop effective verification tools to substantiate predicted energy savings for the residential and small/medium commercial sectors. 2. Promote widespread use of tools that provide feedback on actual delivery of promised savings. 3. Provide quick and easy access to energy usage data for use in performance verifications. (See Strategies 2.1.3 and 2.1.6.) 	Codes and Standards, Intelligent Outreach	
<p>3.2.2 - Incentives Tied to Performance Employ performance-based incentives to support savings realization and Local Government (LG) persistence, in tandem with finance mechanisms (Goal 5) that manage cash flow.</p>	Customer Incentives (P4P), Whole Home	
<p>3.4.2 - Develop and/or Enhance ZNE Retrofit Design Tool Kits Identify building/business types well-suited for ZNE retrofits but where current ZNE guidance is scarce. Provide design and financing guidance to ease adoption of ZNE retrofit strategies.</p>	Codes & Standards	
<p>3.4.3 - Provide Incentives and Other Financing Mechanisms Make financing widely available for ZNE retrofits.</p>	Financing	
<p>4.1.1 - Pilot Energy Asset Ratings With the Real Estate Industry Introduce the uniform property valuation approaches established in Strategy 1.4 to appraisers, commercial leasing agents, and other real estate actors.</p> <ol style="list-style-type: none"> 1. Partner with California appraisers, leasing agents, local governments, and rating tool providers to pilot the building energy asset rating methods adopted in Strategy 1.4. 2. Modify the final specifications for the uniform building energy asset rating methods based on industry feedback gathered in the above pilots. 	Workforce Education and Training	
<p>4.1.2 - Energy and Water Cost Savings Develop and compile information on building lifecycle and/or building occupant tenure cost reductions for energy and water efficiency measures. Develop separate cost savings estimates as needed for each unique commercial business category and building type, as well as unique residential dwelling type. Incorporate regional (for example, climate) differences in expected cost savings information, when appropriate.</p>	Partnering	
<p>5.2.3 - Split Incentives Assess and encourage new cost recovery mechanisms such as surcharge on tenant meters or “green leases” to surmount “split incentive” dilemma.</p>		
<p>5.7.1 - Balanced Assistance Options Work with stakeholders to assess optimal balance of assistance options across financing, on-bill repayment tied to meter, and grants or direct installation to maximize water and energy efficiency levels, using ratepayer, occupant, or other funds.</p>	Partnering	

Appendix B: Applicable Legislation		Program Intervention Strategies
	<p>5.7.3 - Multifamily Buildings</p> <p>Integrate low-income household services with building owner eligibility for regular energy efficiency programs to increase efficiency levels in multifamily buildings with low-income occupants.</p>	Direct Install
AB 802	<p>"§381.2(b) Recognizing the already underway 2015 commission work to adopt efficiency potential and goals, the Energy Commission work on its 2015 energy demand forecast, and the need to determine how to incorporate meter-based performance into determinations of goals, portfolio cost-effectiveness, and authorized budgets, the commission, in a separate or existing proceeding, shall, by September 1, 2016, authorize electrical corporations or gas corporations to provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings.</p> <p>Those programs shall include energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations, as well as operational, behavioral, and retrocommissioning activities reasonably expected to produce multiyear savings. Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission. The commission may adjust the energy efficiency goals or targets of an electrical corporation and gas corporation to reflect this change in savings estimation consistent with this subdivision and subdivision (d)." [Emphasis, added]</p>	Intelligent Outreach, P4P, Whole Home

Appendix B: Applicable Legislation	Program Intervention Strategies
<p>"(c) Effective January 1, 2016, electrical corporations and gas corporations are authorized to implement the provisions of subdivision (b) for high opportunity projects or programs. The commission shall provide expedited authorization of high opportunity projects and programs to apply the savings baseline provisions in subdivision (b).</p> <p>(d) In furtherance of subdivision (b), the commission, in consultation with the Energy Commission, shall consider all of the following:</p> <p>(1) The results of any interagency baseline assessment.</p> <p>(2) Any available results from investor-owned utility baseline pilot studies ordered in D.14-10-046.</p> <p>(3) Information necessary to ensure consistency with the energy forecast and planning functions of the Energy Commission and the Independent System Operator.</p> <p>(e) The commission may direct electrical corporations and gas corporations to make filings that are necessary to ensure coordination with the energy forecast and planning functions of the Energy Commission and the Independent System Operator."</p>	
<p>SB 1414 §399.4 (b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive provides proof of permit closure and certifies that the improvement or installation has complied with any applicable permitting requirements and any specifications or requirements set forth in the California Building Standards Code (Title 24 of the California Code of Regulations), and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.</p> <p>"(d) The commission, in a new or existing proceeding, shall review and update its policies governing energy efficiency programs funded by utility customers to facilitate achieving the targets established pursuant to subdivision (c) of Section 25310 of the Public Resources Code. In updating its policies, the commission shall, at a minimum, do all of the following:</p> <p>(1) Authorize market transformation programs with appropriate levels of funding to achieve deeper energy efficiency savings.</p> <p>(2) Authorize pay for performance programs that link incentives directly to measured energy savings. As part of pay for performance programs authorized by the commission, customers should be reasonably compensated for developing and implementing an energy efficiency plan, with a portion of their incentive reserved pending post project measurement results.</p> <p>(3) Authorize programs to achieve deeper savings through operational, behavioral, and retrocommissioning activities.</p> <p>(4) Ensure that customers have certainty in the values and methodology used to determine energy efficiency incentives by basing the amount of any incentives provided by gas and electrical corporations on the values and methodology contained in the executed customer agreement. Incentive payments shall be based on measured results."</p>	<p>See, Response to SB 350 requirements</p>

Appendix B: CPUC Regulatory Directives

Sector-specific CPUC Regulatory Directives	Cite	Response
<p>Program administrators shall ensure a smooth transition between existing energy efficiency program activities and the changes outlined in this decision, to be proposed in the business plans due January 15, 2017, minimizing program disruptions and avoiding any funding hiatus for ongoing efforts or partnerships.</p>	<p>D.16-08-019, OPN 14, p. 112</p>	<p>See, Program Delivery discussion. During the transition to a new programs and structure, SoCalGas will continue existing programs until newer programs are capable of replacing existing programs. In some cases, multiple programs may co-exist in the market for a limited time.</p>
<p>As discussed above, we will require all of the upstream and midstream program delivery types to be administered according to the statewide definition adopted in this decision. These sub-programs include, but are not necessarily limited to:</p> <p>Residential [Emphasis added]</p> <ul style="list-style-type: none"> • Plug Load and Appliances Midstream • Residential Heating Ventilation and Air Conditioning (HVAC) <p>- Upstream/Midstream</p> <ul style="list-style-type: none"> • Residential New Construction <p>Commercial</p> <ul style="list-style-type: none"> • Commercial HVAC – upstream and midstream • Savings by Design <p>Lighting (even if moved to sectoral program area)</p> <ul style="list-style-type: none"> • Primary Lighting • Lighting Innovation • Lighting Market Transformation <p>Financing</p> <ul style="list-style-type: none"> • New Finance Offerings <p>Codes and Standards</p> <ul style="list-style-type: none"> • Building Codes Advocacy • Appliance Standards Advocacy <p>Emerging Technologies</p> <ul style="list-style-type: none"> • Technology Development Support • Technology Assessments • Technology Introduction Support <p>Workforce, Education, and Training Programs</p> <ul style="list-style-type: none"> • Connections 	<p>D.16-08-019, pp. 62-64</p>	<p>See, Program Delivery discussion. SoCalGas will work with other IOUs to create a single statewide program, consistent with the CPUC’s statewide definition, for the following residential program offerings:</p> <ul style="list-style-type: none"> • Plug Load and Appliances Midstream • Residential Heating Ventilation and Air Conditioning (HVAC) • Residential New Construction

Appendix B: CPUC Regulatory Directives		
Sector-specific CPUC Regulatory Directives	Cite	Response
<p>Government Partnerships</p> <ul style="list-style-type: none"> • California Community Colleges • UC/CSU • State of California • Department of Corrections and Rehabilitation <p>Marketing, Education, and Outreach Energy Upgrade California campaign [not part of the SW requirement]</p>		
<p>8. All upstream and midstream programs, including but not necessarily limited to the following programs and/or subprograms from the existing portfolio, plus new programs proposed in business plans that are market transformation, upstream, or midstream, shall be delivered statewide according to the definition in Ordering Paragraph 5 above: Residential: Plug Load and Appliance Midstream, Heating Ventilation and Air Conditioning (HVAC) Upstream/Midstream, New Construction [Emphasis added]; Commercial: HVAC Upstream/Midstream, Savings by Design; Lighting: Primary Lighting, Lighting Innovation, Market Transformation; Financing: New Finance Offerings; Codes and Standards: Building Codes Advocacy, Appliance Standards Advocacy; Emerging Technologies: Technology Development Support, Technology Assessments, Technology Introduction Support; Workforce, Education, and Training: Connections; Government Partnerships: California Community Colleges, University of California/California State University, State of California, Department of Corrections and Rehabilitation.</p>	<p>D.16-08-019, OPN 8, pp. 110-111</p>	<p>See, Program Delivery discussion. SoCalGas will work with other IOUs to create a single statewide program, consistent with the CPUC’s statewide definition, for the following residential program offerings:</p> <ul style="list-style-type: none"> • Plug Load and Appliances Midstream • Residential Heating Ventilation and Air Conditioning (HVAC) • Residential New Construction

Appendix C: EM&V Studies

CPUC EM&V Studies:

[pending]

CEC Studies:

A Study of Barriers and Solutions to Energy Efficiency, Renewables, and Contracting Opportunities Among Low-Income Customers and Disadvantaged Communities, Draft Study Report, CEC, CEC-300-2016-009-SD, dated September 2016

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Appendix D: External Stakeholder Observations

Appendix D: External Stakeholder Observations				
Ref.	Recommendation	Date	Source	Response
0045	Suggestion that hard to reach markets needed to be studied more closely	2/23/2016	2/23/16 Res SC Mtg	Requested market study of disadvantaged communities
0046	inclusion of consideration for AB 793 (energy management technology) in Business Plan	2/23/2016	2/23/16 Res SC Mtg	See, Intelligent Outreach strategies
0047	Are rewards for addressing plug loads sufficient to implement change in the market?	2/23/2016	2/23/16 Res SC Mtg	See, EMV Considerations. Evaluation of markets and technologies recommended.
0051	Suggestion made that if cost is an issue for whole home programs, can offer on-bill financing.	2/23/2016	2/23/16 Res SC Mtg	Financing strategy proposes to direct eligible customers to leverage PACE loans. Due to consumer lending laws, on-bill financing is not an option for residential customer.
0056	Request made for presenting data regarding middle income customers broken out from general residential segment.	2/23/2016	2/23/16 Res SC Mtg	See, Section A.6, Customer Landscape
0059	Comment made that PA presentations did not address market gaps as related to overall goals. Example, strategy for targeting homebuyers market/point of sale has not been addressed. Discussion about engaging real estate industry in the BP process.	2/23/2016	2/23/16 Res SC Mtg	See, Section B.1, Program Intervention Strategies (Homeowner Resale)
0092	PAs residential business plans should explicitly address the idea of real estate engagement. There has been substantial investment in this area over the last 5 years, particularly through the RENs and it's highlighted in the Energy Commission's Existing Buildings Energy Efficiency Action Plan (strategy 4.1). Not clear in Market Assessments and Gaps that IOUs are considering this. Two documents shared to support this comment. [RS0208 and RS0209]	3/15/2016	RS0207	See, Section B.1, Program Intervention Strategies (Homeowner Resale)

Appendix D: External Stakeholder Observations				
Ref.	Recommendation	Date	Source	Response
0093	Suggestion of several "trigger points" to be considered in assessing residential market strategies	3/15/2016	RS0217	
0105	<p>The volume and pace of residential EE retrofits is low compared to California's ambitious energy reduction goals as set forth in SB 350, AB 32, AB 802, AB 758, the California Long-Term Energy Efficiency Strategic Plan. If California is to realistically achieve its long term goals, the current approach to realizing energy efficiency in the residential sector will need significant overhaul.</p> <p>Increased commitment to workforce education and training whether as part of a Market Transformation program or a WE&T program. Strategies might include improving access to technical training, job shadowing, mentoring, sales training, process improvement consulting, and other consultative activities. In addition, use program funding for Loan Loss Reserve (LLR) in order to buy down interest rate for homeowners and drive deeper market penetration. Similar programs have fixed interest rates starting at 2.75% APR. Appropriate Metrics: Penetration of market, participating contractors, savings per site on a segmented basis.</p>	3/30/2016	RS0225	See, Workforce Education & Training Business Plan

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
0106	<p>Given that PLA (plug loads & appliances) will be responsible for 70% of electricity demand growth between 2015 and 2024, according to NRDC, new plug load strategies were identified in the Long-Term EE Strategic Plan, but the IOU gap analysis shows that utilities face challenges adopting these strategies under current policies.</p> <p>Two complementary high-level intervention strategies have been highlighted in the Long Term Energy Efficiency Strategic Plan: See [RS227]</p> <ul style="list-style-type: none"> • Accelerate technological innovation through market transformation (for example, by establishing dynamic reach standards and incentives for manufacturers, retailers and/or consumers) <p>Performance metric: Change in rate of improvement in the market weighted average energy consumption of PLA</p> <ul style="list-style-type: none"> • Spur customer demand for highly efficient products (for example, by investing in market transparency) <p>Performance metrics: Ratio of energy consumption of products selected when energy attribute information is available vs. not available and trends over time; ease of obtaining actionable information on energy attributes</p> <p>In addition to transparency, there is a range of behavioral intervention strategies that can be deployed to nudge shoppers toward more efficient purchases (digital marketing).</p> <p>Other strategies would be to</p>	3/31/2016	RS0227	See, Intelligent Outreach, Disadvantaged Community Outreach, Single-Point-of-Contact, Homeowner Resale, Customer Incentives, Direct Install, Midstream Appliance, Whole Home

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	<p>better integrate plug loads into audit, whole home retrofit zero net energy new construction initiatives, and to invest in better PLA market & consumption data enabled by digital technology. Yet there are aspects of the current policy framework that make it difficult for utilities to invest in such intervention strategies (including better data) at scale, despite their inclusion in the Long Term Energy Efficiency Strategic Plan. Examples include the requirement to minimize non-incentive budgets, or the cost-effectiveness thresholds/methods, which assign costs, but not benefits, to non-resource programs. Innovative behavior and market transformation strategies also call for practical evaluation approaches suited to the nature of these programs. It may make sense to carve out some portion of EE budgets that can be used to invest into these new strategies, free from policy constraints that were designed – and made sense – for traditional EE resource acquisition programs. A key question is whether the IOU Business Plans will be adequate to support a reversal of the growth of plug load energy consumption. The Stage 1 IOU submissions pointed to data gaps and policy barriers, which – unless addressed – may prevent the State from achieving the plug load goal (which will also make it more difficult to achieve the ZNE goal).</p>			

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
0108	<p>Residential direct install programs are experiencing lower rates of CFL installations and increased customer demand for LEDs, with lightbulb manufacturers reducing or eliminating their CFL inventory in favor of LEDs. However, based on current DEER workpapers for deemed measures, A-Lamp LEDs can cost up to 5 times as much as their CFL equivalents, but only achieve 48% the energy savings. Current workpapers assume that an LED can replace either an incandescent or a CFL, and therefore uses the lower savings baseline of a CFL to LED conversion for the deemed value of the measure. Residential programs are often restricted from installing more LEDs due to budget and TRC. This is resulting in decreased installations (and therefore, lower savings), stranded opportunities, and preventing widespread market adoption of a better, more efficient technology. An investment needs to be made to overcome this challenge and encourage market transformation for improved long-term outcome</p>	4/1/2016	RS0236, RS0237	Not applicable, electric-only recommendation
0109	<p>We know that non-energy benefits (for participants, utilities, and society) are a meaningful qualitative and quantitative outcome of many energy efficiency programs, particularly in the residential sector. However, cost-effectiveness requirements and TRC often have the unintended effect of limiting what these programs can do. This can not</p>	4/1/2016	RS0238	Current CPUC's required dual-test for a cost effective portfolio applies across all EE portfolios including those delivered by local government-sponsored administrators.

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	<p>only stifle innovation, but also prevents IOUs and the CPUC from capturing and claiming the full value and benefit of energy efficiency programs.</p> <p>In PG&E territory (and likely within other IOUs, but PG&E is where our experience lies), local government partnerships are where locally-driven programs have the opportunity to grow and innovate based on the needs of the community. While TRC and cost-effectiveness can still be a barrier, greater credence is given to non-energy benefits because programs are tailored to additional community priorities such as workforce development, water conservation, or poverty alleviation. Viewed as a portfolio, more room can be made for residential programs that achieve both resource and non-resource benefits,</p>			
0132	<p>Proposal for Home Upgrade --</p> <ol style="list-style-type: none"> 1. Expand measures 2. Create 1 program for customers to lower confusion but can maintain multiple programs for contractors to take advantage of contractor expertise. 3. Consider multilevel incentive tiers for contractors. 4. Customer journey – enroll once and continue engagement over time 	4/27/2016	4/18/16 Residential SC Mtg	See, Whole Home strategy. Two key objectives of the proposed strategy are to simplify program participation and increase the adoption of whole home approaches.
0133	<p>Regarding changes to Home Upgrade program, "What are the metrics for HU? Some programs were told to increase participation. Will there be hard targets in the future?"</p>	4/27/2016	4/18/16 Residential SC Mtg	The overall goal for EE portfolio is to increase the adoption of whole home approaches by homeowner.

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
0134	Re Home Upgrade Program--high level observation: IOUs still working under the method of how savings are calculated but from the CEC perspective 802 is driving changes in how energy savings are captured. CEC is working out how this will change. IOU still presenting the current method of calculating savings. State focus is to “reduce the middle man” make it more available to customer. CEC would like to see more focus on PA side to use the data to drive the market: “customer is the mini power plant.” Consider a model of getting a check back if customer stays below baseline. Need to think hard about how to get away from the status quo with goal to get away from the thinking that everything needs to be counted up front.	4/27/2016	4/18/16 Residential I SC Mtg	The success of the business plan will depend, in part, on the ability to encourage and validate behavioral savings. Typically, awareness of potential bill savings is adequate incentive to modify/reset the customer’s behavior to conserve energy and shift energy load. See, Section B.1, Intelligent Outreach strategy.
0135	Re Home Upgrade Program--PAs should consider leveraging the investments customer are already making, such as smart thermostats. That would help increase cost effectiveness. Try to give customers choice with other tools. Need to utilize, recognize these evolving tools.	4/27/2016	4/18/16 Residential I SC Mtg	See, Section B.1, Intelligent Outreach strategy
0136	Re Home Upgrade--contractors mentioned at the HU Working Group that they don’t want a whole lot of changes made to the program. Just getting the business plans set so don’t throw out or change significantly. Incremental changes are more workable	4/27/2016	4/18/16 Residential I SC Mtg	The primary focus of the strategy is to simplify customer program participation; modify program design to improve cost efficiency; and promote greater whole home actions.
0137	Re MF programs--Does public housing belong in the public or MF sectors?	4/27/2016	4/18/16 Residential I SC Mtg	Yes, the energy use characteristics are similar within segment. Various program offerings will be

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
				delivered through a Single Point-of-Contact strategy to simplify engagement for all customers across segment.
0138	BayREN portfolio approaches seem successful, are other PAs considering the same approach? Number of MF portfolio managers are participating in better building challenge. Working with portfolio managers seems like a good idea.	4/27/2016	4/18/16 Residential I SC Mtg	
0139	Re MF properties--cost effectiveness, is it a valuable metric for this segment? Not addressed in any presentation except PG&E.	4/27/2016	4/18/16 Residential I SC Mtg	At a program strategy level, cost-effectiveness is a consideration. However, the CPUC EE policies apply cost-effectiveness threshold at the portfolio level. So a cost-effectiveness metric applied at the customer segment level is not practicable.
0140	RE Home Upgrade --lack of time owners have to engage in the process. Has there been any thought into consolidating all programs into one and have program coordination from the PAs?	4/27/2016	4/18/16 Residential I SC Mtg	Simplified customer participation is a major objective throughout the Business Plan. Various process improvements will be implemented to reduce participation barriers.
0141	With respect to the issue of integration across EE, DR, DG, etc., in MF program. What types of support or assistance would you need for these integration issues? Specific interest in integrated solutions. Can we get to a one stop integrated solution that includes EV, battery storage, solar, etc? Breaking down silos is important. Successfully done on San Francisco side as well as SMUD. Look at these examples.	4/27/2016	4/18/16 Residential I SC Mtg	See Program Intervention Strategies, Single Point of Contact. This tactic will coordinate all EE-related programs as well as other DSM opportunities to the key customer decision-makers in the MF segment.
0142	Re Residential Programs -- We've spent a lot of money evaluating current programs. Use those EM&V reports. Look at the recommendations, and pay	4/27/2016	4/18/16 Residential I SC Mtg	See, Appendix B, for responses to applicable EM&V recommendations.

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Ref.	Recommendation	Date	Source	Response
	attention to specific and small recommendations. Don't ignore this resource.			
0159	Even though MCE and the other PAs support the move toward single point of contact, because customer confusion is such a large barrier, the single point of contact approach needs to be dis-cussed in all the Business Plans.	5/12/2016	4/25/16 Residential Follow Up Webinar	See, Section B.1, Single-point-of-Contact strategy
0160	We need to better account for non-energy benefits in our program cost effectiveness analyses, including comfort, health benefits, etc. We also need to capture in increase in home values that accrues after EE retrofits are completed. There is plenty of value to the apparently non-cost effective residential upgrade programs, but we aren't capturing it.	5/12/2016	4/25/16 Residential Follow Up Webinar	See, Section B.1, Home Resale strategy
0161	Can we look at differential variations by climate zone in the Business Plan description of the challenges and solutions. Consistency is key across the business plans, so everyone should attempt to address this if some already are.	5/12/2016	4/25/16 Residential Follow Up Webinar	As part of the Customer Incentive strategy, Section B.1, incentives may be varied to account for unique market characteristics and reliability including weather.
0183	Res EE delivery is still fundamentally a market transformation issue, but programs are not being administered or evaluated that consistent with that reality. Establish that Residential programs will be considered strategic market transformation (SMT) program until such time that the markets are determined to have been transformed. M&V timeline should be set for either phase 3 or in the PIP. More	6/1/2016	RS0276	

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Ref.	Recommendation	Date	Source	Response
	detail in RS0276 on CAEECC website.			
0184	Rural communities face significantly higher obstacles to Market Transformation than more populated areas. Successful residential Direct Install delivery should be localized and fully integrated across channels.	6/1/2016	RS0276	See, Section B.1, Disadvantaged Communities Outreach, Direct Install
0185	Current cost-effectiveness (TRC) should not be applied to residential programs. Define residential programs as Strategic Market Transformation program and make it a non-resource program. Or consider societal cost test as opposed to TRC or a more robust cost-effectiveness test. See more detail in RS0276	6/1/2016	RS0276	Recommendation should be directed at the policy track of this proceeding.
0186	Regions served by multiple PAs experience lack of coordination and discordant messaging in terms of priorities and implementing programs. Interpretation of state policy is also inconsistent. Propose establishment of a localized "program implementer" approach with greater utilization of LGPs where available, that are able to implement market interventions at the community level.	6/1/2016	RS0276	See, Section B.1, Partnering strategy that will actively partner with other market actors to increase customer adoption of EE solutions.
0193	Re MF presentation on 4/18: Problem Statements: Add 2 problem statements: (1) multifamily sector is underserved compared to available potential and (2) programs not designed to meet needs of building owners.	6/2/2016	RS0279 - RS0284	See, Section B.1, for variety program intervention strategies that will increase program participation in the multifamily segment.

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Ref.	Recommendation	Date	Source	Response
0194	Re MF presentation on 4/18: Program Length: Work with CPUC to approve 3-5 year implementation and incentive budgets.	6/2/2016	RS0279 - RS0284	
0195	Re MF presentation on 4/18: Program Outreach/Delivery: Provide meaningful, comprehensive services to owners by hiring additional “single point of contacts” for customers.	6/2/2016	RS0279 - RS0284	See, Section B.1, Single-Point-of-Contact strategy
0196	Re MF presentation on 4/18: Program Design: Provide consistent approach to each project (while tailoring solutions on the utility-side based on the building’s metered data); Shift away from product rebates to more holistic offerings determined by robust energy assessments; Create long-term plans to ensure MF programs contributing to Net Zero goals.	6/2/2016	RS0279 - RS0284	See, Section B.1. Partnering strategy
0197	Re MF presentation on 4/18: Financing/Incentives: Increase incentive amounts for owners to overcome split incentives and increase participation; Assure incentives are reliable at project outset and are tailored to fit with refinancing loans; Provide phased payments to owners during construction to offset upfront costs; and Increase EUC budgets beyond pilot level to better serve the market.	6/2/2016	RS0279 - RS0284	See, Section B.1, Customer Incentives – Pay-for-Performance strategy
0198	Re MF presentation on 4/18: Fuel-switching: Separate combustion safety costs from overall cost effectiveness tests; Provide clarity on 3 pronged test for fuel switching.	6/2/2016	RS0279 - RS0284	See, CPUC Energy Efficiency Policy Manual and the Standards Practice Manual for discussion on the applicability of the Commission’s 3-prong test.
0199	Re MF presentation on 4/18: Cost-effectiveness/ EM&V:	6/2/2016	RS0279 - RS0284	Recommendation should be directed at the policy track of this

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Ref.	Recommendation	Date	Source	Response
	Incorporate benefits of market transformation in cost effectiveness tests; Pilot or fully transition to meter-based savings calculations.			proceeding. See, Section B.1, Pay-for-Performance strategy to encourage meter-based energy savings estimates for applicable residential projects.
0200	Re MF presentation on 4/18: Data/Benchmarking: Assist owners in benchmarking properties through EPA Portfolio Manager; Use whole-building data and AMI data to target outreach and tailor program design.	6/2/2016	RS0279 - RS0284	See, Section B.1, Intelligent Outreach strategy
0201	Re MF presentation on 4/18: Metrics: Track attrition: percentage, reasons, timing; Create stakeholder group to review metrics and implementation on periodic basis.	6/2/2016	RS0279 - RS0284	See, Section B.1, presentation of proposed sector-level metrics
0202	We see that the metrics for this segment adhere to traditional measures of cost-effectiveness – energy savings, TRC and PAC, and cost per unit of energy (page 4). Page 11 notes that energy efficiency has focused on energy savings, while 48% of customers cite the value of home upgrades as being non-energy related. Recommended Action <ul style="list-style-type: none"> • We suggest metrics that include non- energy benefits and social ROI, in order to capture the true value of energy efficiency work, particularly given the new emphasis on behavioral programs and how customers value energy efficiency upgrades. 	6/2/2016	RS0285	See, Section B.1, presentation of proposed sector-level metrics. Tracking metrics tied other unreliable data sources distort achievements.

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Ref.	Recommendation	Date	Source	Response
0203	We see that there is “very low adoption of household sockets with high quality LED lamps [aka California quality spec, CEC spec, CA Voluntary spec]” (page 15), and yet a desire to transition to these lamps. The CEC specs for LEDs, while promoting a high-quality product, further that barrier, in our experience. While LED prices have finally begun to come down, bulbs that meet the CEC specs are significantly more expensive than their EnergySTAR counterparts. With the true value of LEDs not reflected in their deemed savings values as compared to CFLs, this ensures that LEDs will continue to not be cost-effective. Further, manufacturers and distributors are not producing or carrying bulbs that meet those specs, making them difficult to find and obtain. (Rationale given by some distributors is that there isn’t sufficient demand for bulbs that meet those specs, particularly given the higher cost.) Finally, adding yet another qualification beyond EnergySTAR promotes market and customer confusion.	6/2/2016	RS0285	Not applicable. Electric-only recommendation.
0204	The draft proposes a shift away from “traditional incentives” and simplifying the portfolio. We support these things, but encourage consideration of customers who may be left behind and lose opportunities as a result of this shift. Recommended Action <ul style="list-style-type: none"> • We support the emphasis on data-driven targeting, metered-based savings, and behavioral programming and incentives (pages 3-4) as part of a holistic 	6/2/2016	RS0285	See, Section B.1, Intelligent Outreach, Customer Incentive and Direct Install strategies

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	<p>package of offerings that also includes traditional incentives. While they offer great potential and should be emphasized in incentives and programming as a way to promote long-term sustainability and change, behavior and motivation are extremely difficult to influence and measure. Direct install, for example, has the benefit of having an immediate impact that does not rely on an individual’s behavior. Traditional incentives that are proven to work should be combined with and enhanced by “new service and performance models”.</p>			
0205	<p>While Greenbutton is a useful tool and a much better solution than what has existed in the past, our understanding is that using it for single family (or multifamily tenant units) may be challenging, since individual account access needs to be granted by each customer served. It also assumes that the customer already uses PG&E’s online account tools, which may lead to designing solutions for individuals who are already motivated and engaged, rather than inspiring new customer action.</p>	6/2/2016	RS0285	No response. Recommendation is unclear.

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Ref.	Recommendation	Date	Source	Response
0206	<p>Bamberg et al identify time of sale (or more precisely, time of purchase) as an important trigger event that spurs home improvement investments. Real estate professionals can play an instrumental role in connecting their home buying clients with the resources necessary to make smart upgrade decisions. Multiple studies nationwide have shown that certified green homes can command a market premium at time of sale. Capturing this green premium offers a promising avenue for spurring additional home owner investment in green and energy efficient home upgrades. Green Real Estate Working Group has put forward a suite of recommendations for greening California’s real estate sector. Likewise, Elevate Energy (formerly CNET) has prepared a Visible Value Blueprint for realizing the added market value of green real estate investments. Several PA business plans addressed these recommendations, notably PG&E, SDG&E BayREN, and SoCalREN. The remaining PAs should address how these recommendations fit or do not fit into its business plan.</p>	6/2/2016	RSO287	See, Section B.1, Homeowner Resale strategy
0211	<p>ME&O: We do not understand the intent of IOU strategies for “community-based ME&O” that are silent regarding the connection to Local Government Programs and RENs. It appears that IOUs, local governments and RENs are competing in this space – there needs to be a cohesive set of strategies articulated by all</p>	6/2/2016	CM0288	See, Section B.1, Partnering, Intelligent Outreach, Disadvantaged Community Outreach, Single Point-of-Contact strategies

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Ref.	Recommendation	Date	Source	Response
	<p>PAs that are consistent with each other. What is the strategic difference between SDG&E’s “single point of contact” vs. LG/RENs “Energy Advisor”?</p> <p>Consider deploying a statewide campaign that advertises this offering for mass markets. We think this approach should deliver cost reductions compared to individual and disparate PA efforts. ME&O efforts should borrow from other local/regional successes – for example, StopWaste’s very successful food composting public awareness campaign.</p>			
0214	<p>HE Score should be communicated and deployed as a preliminary assessment, not an asset rating, in all business and implementation plans. For example, the City of Berkeley’s RECO is using HE Score to drive customers to Home Upgrade programs, not as real estate asset information. Using HE Score solely as a preliminary assessment tool is consistent with the California Home Energy Rating System (HERS) statute, which states that there should NOT be multiple asset rating approaches used in CA. This is also most consistent with known benefits and limitations of HEScore.</p>	6/2/2016	CM0288	See, Section B.1, Homeowner Resale strategy
0277	<p>CPUC #1 Clarify the HTR definition and whether the BayREN programmatic effort is in fact bringing in the “right” participants.</p>	10/2/2016	RS0330	Not applicable
0278	<p>CPUC #1 Clarify statement regarding cost- effectiveness in order to make the document less</p>	10/2/2016	RS0330	

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	promotional and more representative of actual forecast C/E.			
0279	CPUC #2 BayREN states that it has “trained a new group of contractors, increasing their knowledge and interest in EE.” If there is not any supporting evidence for this promotional claim, it should be removed.	10/2/2016	RS0330	
0280	CPUC #3 - BayREN asserts that low TRC can be attributed to early efforts to ramp up a program. However, 2017 will be the 5th year of a program that is expected to cease incentives by 2023. In light of decreased TRC for 2017, per 2017 Budget AL request, Isn't 50% of a program's expected life “ramped up”? Please provide additional information on when the ramp up period ends (or ended), including milestones for the remainder of the program.	10/2/2016	RS0330	
0281	CPUC #3.1 -- (re page 6) PA's BP statements need to be supported (and not contradicted) by their AL submissions with respect to observation that PA requests to increase HUA budget with the objective of increasing participation in the Hupgrade Program. However their PIP table 3. shows a proposed increase in the Home Upgrade Advisor Program by 50% but a %20 reduced goal for completing an actual EE project! This contradicts their claim in the BP.	10/2/2016	RS0330	

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Ref.	Recommendation	Date	Source	Response
0282	CPUC#3.2 - (re page 6) PA's BP statement need to be supported (and not contradicted) by their AL submissions given that BayREN is requesting a %24 increase in their Multi Family Residential Budget (from 2015), while planning to achieve less savings at a higher cost/unit!!! BayREN is increasing their "Administrative"and"Marketing" budget, while at the same time cutting "Rebates" by more than %50! So essentially BayREN is asking for more money (to do marketing) to acheive less savings more expensively!!!	10/2/2016	RS0330	
0283	CPUC #4 - (re page 8-10) While aggressive goals are appreciated, the math has to add up. BayREN needs to establish whether a doubling of homes year on year is realistic, and at what cost, and how 5% of market is in any way achievable. [see more specific items of concern in full comment document]	10/2/2016	RS0330	
0284	CPUC #5 - (re page 13) PA's need reliable evidence to support each of these claims as they relate to projected future program performance regarding, BayREN describes how, by the end of year 8 of program implementation (2020), it will reduce incentives as the program becomes more "affordable" and is supported by a 'robust industry'.	10/2/2016	RS0330	
0285	CPUC #6 - PA's need reliable evidence as to expected program performanceIncreased contractor training is deemed essential to BayREN's efforts. It's unclear how many contractors, and of what size, will require training and	10/2/2016	RS0330	

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Ref.	Recommendation	Date	Source	Response
	<p>over what timeframe that training will occur. If just 7% of contractors have completed 51% of the jobs to date (pg. 11), how will training smaller contractors improve program delivery? Will there be higher costs to train a larger number of smaller contractors?</p>			
0286	<p>CPUC/CLN-1 - (re page 9, 12) RE: coherency, clear reasoning, and justification for activities, I am confused on how THIS BP works in relation to the PG&E Service area BP – e.g. where some program activities are offered by the REN and perhaps other activities for the same market segment(s) are offered by PG&E. Further, how do these 2 relate to a “statewide” residential sector strategy?</p>	10/2/2016	RS0330	
0287	<p>CPUC/CLN-2 - (re page 5) I was pleased to see the energy savings and cost-effectiveness data presented for SF andMF. But that said, I am astounded to see that BayREN thinks ANY expenditures on their part are warranted if the strategies will produce only a 0.25 cost- effectiveness outcome. It would seem BAYEEN may have a “winning strategy” for pursuing multi-family buildings. If so, Perhaps should stick with that.</p>	10/2/2016	RS0330	

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Ref.	Recommendation	Date	Source	Response
0288	<p>CPUC/CLN-3 - (re page 6) Not all the strategies are “key strategies” and in fact some sound like supporting activities. I recommend your nesting or bundling as appropriate, and indicate where you have certain implementing tactics or supporting activities. E.G. For single family, R1 and R3 seems to be key on the “supply side (streamlining program and increasing numbers of trained contractors), while R2, R4, R5 seem to be supporting activities to somehow drive demand. But unclear how this will actually do so. The MF strategies seem more coherent. But we need to know more about ownership profiles relative to the strategy for pursuing on-going relationships – would this be for a specific building, or with owners who have portfolios of buildings? I look forward to seeing more about how market demand will be driven via traction and success on green labels and MLS data. I had time to read only to p. 12.</p>	10/2/2016	RS0330	
0289	<p>CPUC/CLN-4 - (re page 1 and 20) Text mislead on degree of “central systems”. These are mostly for water heating only, and unlikely to bring about a “whole building upgrade”. P. 20 suggests only 20% of the MF markets has both central water AND space heating, and thus a circumstances that might support a landlord’s investment. I assume that in this case there is a central GAS meter, but unclear if individual units are metered for and pay for electricity. (lighting, appliances, plug loads?)</p>	10/2/2016	RS0330	

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0370	Silent Running-1 (general comment) Augment the narrative to provide greater detail regarding how the BayRen proposed Business Plan is coordinated with and complementary to other program administrators per Ordering Paragraph 1, of Final Decision R.13- 11-005.	10/2/2016	RS0341	
0371	Silent Running-2 (re page 2) Provide greater level of detail regarding the geographic location (e.g. zip code, city, etc.), size, number, and nature of low-income and disadvantaged communities drawing from existing demographic sources (e.g. census data)	10/2/2016	RS0341	
0372	Silent Running-3 (page 3) It is suggested that other finance programs be explicitly mentioned and considered inclusive of Residential PACE programs, and Pilots currently being developed by the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) (e.g. Master Metered Multi- Family Finance Program). http://www.treasurer.ca.gov/caeatfa/cheef/	10/2/2016	RS0341	
0373	Silent Running-4 (re page 4) Suggest modifying the narrative to suggest similar EMV treatment for similar types of programs without regard to type of PA. It is agreed that CPUC EMV policy can (and likely should) be tailored around different types of programs; however, the BayRen rationale for differentiating EMV approach by type of PA is unclear.	10/2/2016	RS0341	

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Ref.	Recommendation	Date	Source	Response
0374	Silent Running-5 (re page 8) The Metrics section provides no specifics around go-forward market penetration either with respect to participation rates or energy efficiency savings rates (energy efficiency savings/target sector energy consumption). It is suggested that this metric be included in the overall analysis and potentially stratified by geographic area, climate zone, and/or market subsegment. Similar action recommended for other Resource Programs in this Business Plan.	10/2/2016	RS0341	
0375	Silent Running-6 (re page 10, figure 2) Provide Breakdown by Geography inclusive of participation rates and energy savings rates. Provide Breakdown by major demographic categories (e.g. low income and disadvantaged communities, English as Second Language, etc.)	10/2/2016	RS0341	
0376	Silent Running-7 (re page 16, Figure 2) The last paragraph discusses providing resources regarding multiple financing offerings and leveraging support of Go Green Financing Program (http://myenergy.energyupgrade.ca.org/page/gogreenfinancing). Provide support narrative from New Financing BP (under development) and some indication of current market need/market barriers for the use of finance by residential and multi-family customers. Is lack of available financing slowing uptake in the BayRen territory and if so, is this specific to certain marketplaces?	10/2/2016	RS0341	

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Ref.	Recommendation	Date	Source	Response
0377	Silent Running-8 (re page 19) A reference is made to “District Level EE and ZNE.” Provide greater detail around what is meant by “District Level”	10/2/2016	RS0341	
0378	Silent Running-9 (re page 19, fig 6) Provide as much detail as possible about the currently understood breakout of Common Area Energy Consumption vs Tenant Energy Consumption, how this might vary across the BayRen territory and whether there is significant project opportunity in either (or both) sub segments.	10/2/2016	RS0341	
0379	Silent Running-10 (re page 25) The first paragraph references “Policies may require benchmarking”. The City of San Francisco has an ordinance requiring Energy Usage reporting by major building managers/owners in the City. http://sfenvironment.org/article/benchmarking/how-to-comply-with-benchmarking-in-san-francisco . Please provide greater detail regarding the potential pro’ and con’s of the BayRen Business Plan developing a model ordinance of this type for other cities in its territory that would apply to multi-family buildings and the costs and benefits of providing this element. Suggested benchmarking parameters are Energy Use Index and Energy Cost Index	10/2/2016	RS0341	
0380	HEA-1 (re page 1) Overall goals in the residential sector are not well defined. Provide numerical goals for the whole section or by program segments.	10/2/2016	RS0342	

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Ref.	Recommendation	Date	Source	Response
0381	HEA-2 (re page 4, 6, 7, 13) The reason and means for shifting away from incentives and rebates for the residential market is not clear. Explain the why this is a goal and what market drivers will make it happen in the 8 year time frame.	10/2/2016	RS0342	
0382	HEA-3 (re page 13, 14, 34) A major market barrier to whole house upgrades is lack of consumer understanding of their benefits. Please quantify the monetary benefits for the average home owner for doing a whole house upgrade.	10/2/2016	RS0342	
0383	HEA-4 This plan does not contain programs for renters of single family homes, and owners or renters of condos or townhomes. Please expand Home Advisor to help these residents.	10/2/2016	RS0342	
0396	CSE-1 Pilot programs briefly bulleted on pages 18-19 do not tie in with contextual and strategy discussion above <ul style="list-style-type: none"> o ZNEforExisting Residential Single Family Homes o DistrictLevelEEandZNE o ResilientHomes o Long-termCustomer Journey program <p>Please provide vision and expected accomplishments associated with the pilots briefly bulleted on pages 18-19. Tie the pilots to market barriers and strategies.</p>	10/3/2016	RS346	
0397	CSE-2 Surveys and research are referenced without citation. Example, "Recent real estate and apartment industry surveys reveal trends that the renter population is more permanent	10/3/2016	RS346	

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	<p>and likely to grow compared to single family homeowners.” [p27]</p> <p>Please provide citations when referencing surveys, trends, etc.</p>			
0398	<p>CSE-3 Multifamily sector discussion only briefly addresses AB 802 and energy disclosure requirements that will significantly impact the sector in the next ten years.</p> <p>Please provide additional context associated with AB 802, particularly leveraging the disclosure requirements as a tool/set of strategies to address market barriers.</p>	10/3/2016	RS346	
0400	<p>TURN-1 (re page 2) BayREN indicates, “Additions to the BayREN Single Family program include the possibility of taking on an expanded role in the implementation of the Advanced Home Upgrade Program as PG&E transitions out of this program.” Adding a discussion of the possible benefits / value to BayREN of this expanded role would be helpful / useful, including key goals, strategies to improve and further optimize Advanced HUP, possible challenges relative to BayREN’s current HUP, and transition logistics.</p> <p>TURN recommends that BayREN expand its discussion of Advanced HUP to include this type of information.</p>	10/3/2016	RS0348	

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Ref.	Recommendation	Date	Source	Response
0401	<p>TURN-2 (re page 17, R4) BayREN indicates that it will increase the number of trained whole-house, building performance contractors by “further develop[ing] the skills and business models of the current contractor base so that they are making whole home retrofits a central part of their business models. In addition, BayREN will work with participating contractors who have satisfied program requirements to determine how they can deliver a greater number of jobs and deeper savings.”</p> <p>TURN recommends that BayREN provide more information regarding its plans for increasing the number of trained, whole-house, building performance contractors serving the residential market, and specifically whether this training is intended to support participation in NMEC-based program strategies.</p>	10/3/2016	RS0348	
0402	<p>TURN-3 (re HUP) There is nothing in the draft BP regarding projected cost effectiveness or improvements thereto. There has been a long standing concern that the HUP costs reflected in the TRC are overinclusive because they include some non-energy costs, as recognized by the Commission in D.14-10-046. The Commission invited stakeholders to develop an “empirically- supported” proposal for removing these non-energy costs, but to TURN’s knowledge, no party has developed such a proposal. Does</p>	10/3/2016	RS0348	

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Ref.	Recommendation	Date	Source	Response
	<p>BayREN intend to propose adjustments to the HUP cost-effectiveness methodology along these lines, or at least indicate in its BP that current methods overestimate project costs, which presents an ongoing regulatory barrier to HUP's success?</p> <p>TURN recommends that BayREN at least flag this cost-effectiveness bias.</p>			
0403	<p>TURN-4 (re page 3, 24 re Strategy R8) TURN agrees that trying to insert EE scopes in refinance and recapitalization events is a good strategy. This may help building owners balance efficiency investments with other competing capital needs. Even so, this does not resolve the split incentive issue. Has BayREN considered using AMI data and innovative meter-measured performance strategies for site-specific whole building programs to stimulate broader market interest in NMEC-based pay-for-performance programs? Such an approach could be used to attempt to spur private sector innovation and capital markets investment vs consumer and bldg. owner financing, thus building a market for efficiency, creating transparent and real time accounting for savings using smart meter data, increasing quality installations by making contractors accountable to measured performance, and ultimately reducing program administration and evaluation costs by making the industry (and not just the program) responsible for performance risk.</p>	10/3/2016	RS0348	

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Ref.	Recommendation	Date	Source	Response
	<p>TURN does not see any discussion of financing opportunities for the SF market. Please explain.</p> <p>TURN recommends that BayREN consider explaining its discussion of the program design innovations that might be incorporated during the BP period as part of transitioning away from measure-based incentives in the future. TURN recommends that BayREN address the presence or absence of SF financing.</p>			
0404	<p>TURN-5 (re page 8) BayREN projects a 10-year SF participation rate of 10%, up from the current 5% rate, with a corresponding increase in savings from 11% to 20%, and an increase in the MF participation rate from 5% to 50% with no metric for energy savings. Some discussion of the basis for these projections would be really helpful. The SF participation rate increase seems low, while the MF participation rate of 50% seems optimistic. Even so, BayREN may have good reasons for these projections. We note that missing from the MF metric is projected improvements in savings. MF savings have generally been shallow, focused on common area lighting. How does BayREN intend to improve savings yield?</p>	10/3/2016	RS0348	

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Ref.	Recommendation	Date	Source	Response
	TURN recommends that BayREN explain the basis for its projections for increased SF and MF participation rates, and also add a discussion of improved savings yield from MF.			
0405	TURN-6 (re page 11, 12) These are good examples of using data and information for strategy development and targeting.	10/3/2016	RS0348	
0406	TURN-7 (re page 14) Good possible solution to increasing program uptake.	10/3/2016	RS0348	
0407	<p>TURN-8 (General Comment)</p> <p>TURN’s review and comment on BayREN’s draft residential business plan chapter focuses on Item 2. Content-Related Review, items d – g, of the CAEECC’s suggested guidance review.</p> <p>TURN also considered the extent to which the draft BP chapter addresses customer sector market barriers to greater participation and deeper savings through innovations and synergies via existing and possibly new customer- and market-based strategies and tactics. TURN’s overall assessment of the BayREN residential BP chapter is that it is a thoughtful and earnest plan that has several elements of good strategic thinking. The plan could possibly benefit from consideration of our specific comments in TURN-1 through</p>	10/3/2016	RS0348	

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Ref.	Recommendation	Date	Source	Response
	TURN-4 above.			
0408	<p>TURN-9 (General Comment) Customer sector goals and program savings, budgets ,and cost-effectiveness are forward looking. The BPs are intended to be integral to California moving the currnet generally flat or stagnant needle on energy efficiency. Some quantitative context to the current portfolios and programs would be very helpful.</p> <p>We recommend that all data on projected customer sector goals and program savings, budgets, and cost-effectiveness be given some context relative to ongoing customer sector activities and accomplishments. There needs to be some demonstration as to how the BP will advance savings and improve cost-effectiveness.</p>	10/3/2016	RS0348	
0409	<p>TURN-10 (General Comment) It is not clear whether projected savings are gross annual. InD.16-08-019 (atp.21),the Commission directed a return to net goals and the development of cumulative goals for application in 2018 to support the State’s SB 350 efforts.</p> <p>If not already included, we recommend that BayREN provide</p>	10/3/2016	RS0348	

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	projected customer sector goals and program savings in net annual and net cumulative form, with the basis for net provided, and cumulative specified by the estimated average EUL by customer sector and key programs. Indicate the basis (ie end use, measures) for the estimated average EUL(s).			
0484	ORA-1 - Absence of a budget makes it impossible to verify whether it aligns with strategy and plan. Emphasis on a ten-year end point with little to no incentives should mean substantial budget reductions in outyears	10/3/2016	RS0355	
0485	ORA-2 (re page 34) Metrics are oriented to intermediate program outcomes but not to broader market effects o Example: metrics on p.34 count number of units touched by programs and energy savings per program building, but do not include metrics to judge whether the market is transformed and incentives can be withdrawn. The metric measuring whether EE increases home value at resale is better, although the target is only whether there is a quantified value rather than if the treated homes have higher resale value.	10/3/2016	RS0355	
0486	ORA-3 (re page 22,23) Intervention strategies are less specific. They either largely mirror ongoing activities and/or be outside BayREN’s ability to implement o Example: Strategy on p.22“ introduce policies” to address“ multiple market drivers influence decision making” is hard to pin	10/3/2016	RS0355	

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	<p>down.</p> <ul style="list-style-type: none"> o Example: Strategy on p.23“ flatten the playing field by introducing local government policies in a regionally coordinated manner” ultimately rests with elected officials...ABAG/BayREN may not have the ability/capacity to actually do this. 			
0487	<p>ORA-4 (re page 7) The objectives are also underdefined and more vague than we would like and may be difficult to actually implement</p> <ul style="list-style-type: none"> o Example: objective on p.7“ standardize the inclusion of EE data in property listings” is both ambitious and vague (standardize to what, how would BayREN actually do this?) 	10/3/2016	RS0355	
0488	<p>ORA-5 (re page 20) Assertions of fact or policy need to be fully supported by evidence and citation, not simply opinion</p> <ul style="list-style-type: none"> o Example: Assertion on p.20 that national and state wide studies show that existing MF housing has the potential to save 30% cost-effectively has no citation. o Even when citations are included, there is no reference to specific pages such that references are unverifiable. Example: CEC RASS reference on p. 20 	10/3/2016	RS0355	
0489	<p>ORA-6 (re page 21) Characterizations of market barriers and program attributes/accomplishments are vague, and asserted without documentation.</p> <ul style="list-style-type: none"> o Example: Assertion on p.21 that the MF market is new to EE and 	10/3/2016	RS0355	

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	<p>has low tolerance for “complicated new procedures”</p> <ul style="list-style-type: none"> o Example: Assertion on p.21 that the distribution of ex ante claimed savings “are relatively reflective of the energy end uses in MF properties” cites no actual data on end use distribution for either BayREN projects or all MF properties 			
0545	<p>Notes page 14 - I am asking that third party solicitations should also be included in BPs for RENS and CCAs. BayREN is more program-by-program than any of the other draft chapters. Since they are providing programs, it would be good to provide information about when these will be bid out or if they are not going to be bid out.</p>	10/3/2016	Not Yet Posted	
0546	<p>Notes page 16 - Comment (from CPUC): I have several general observations regarding content:</p> <ul style="list-style-type: none"> • I’m still confused how BPs work. It is not clear how BayREN’s strategies distinguish its vision for how to tap into the market. Is there any coordination with PG&E and the overall market in the State of California? How do we know that these are the right strategies? • Page 5 – figure 1: single family market doesn’t look good compared with multifamily. Is any of this the right approach for the single family market? Should we spend money on this at all, and why? • Pages 6 -7: Vision and intervention strategies - I liked this but when I looked at strategies, only two are strategic, three are more supporting and more like tactics. Seems like they 	10/3/2016	Not Yet Posted	

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	are not all equal.			
0547	<p>Notes page 16 - • I liked BayREN’s mention of market transformation. But, it seems to be taking up 2008 strategic plan goals for market transformation and operational goals.</p> <ul style="list-style-type: none"> • Doesn’t seem like there is reference to 2014 white papers issued by ED. • I looked at realistic-ness of increasing mass targets (p.8). Seems like ambitious goals. I know this is promoted by strategic plan but I didn’t see enough explanation of how that was achievable. • How would you break down the budget to meet those goals? 	10/3/2016	Not Yet Posted	
0548	<p>Notes page 17 - • Great issue raised about whether it makes sense to use whole house residential. How we view success of home upgrade is distorted by cost effectiveness test???. Several years ago PG&E made a proposal to improve metric results. This is a critical issue that needs to be up front. Residential whole house discussion also provides an interesting regulatory issue that needs to be addressed. Picking up PG&E’s home upgrade program (p.2), I’d like to hear more about this – issues, transition logistics,</p>	10/3/2016	Not Yet Posted	

Appendix D: External Stakeholder Observations

Ref.	Recommendation	Date	Source	Response
	<p>benefits to BayREN expanded role. Also, has BayREN considered PG&E’s approach to whole house residential that they are stepping out of? • TURN really appreciates the notion of transitioning out of ratepayer incentives (p.3). I don’t recall seeing financing opportunities for single family. Still getting landlords and building owners to finance multi-family.</p> <ul style="list-style-type: none"> • With regard to metrics (p.8), how do you arrive at these numbers, particularly single family savings and participation rates? • We would like to get away from common area lighting. It would be great to look at program eligibility over three-year period, without having to open and close programs multiple times. 			

Note: SoCalGas is submitting PG&E's SW business plan chapter to fulfill the Codes & Standards Cross-Cutting Chapter for this draft submission.

DRAFT

Energy Efficiency Business Plan

Cross-Cutting Segment Chapter: Codes and Standards

Draft – October 18, 2016

Codes and Standards Business Plan - Draft

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A. Codes and Standards Vision

California's policy goals around energy use are ambitious, and program administrators' (PAs) vision for Codes and Standards (C&S) is that it will play a central role in meeting SB 350 goals, as well as longer-term greenhouse gas (GHG), Zero Net Energy (ZNE), and other broader state policy objectives. To reach the state's ambitious energy efficiency goals, the state needs to increase savings and change the way it uses resources. C&S activities are a cost-effective way to get an ongoing stream of savings. Past C&S efforts have delivered substantial savings,¹ but PAs' vision is to continue to grow these activities to maximize energy savings and support a diverse range of policy objectives.

Codes and Standards 2.0 (C&S 2.0) strategies contribute to California's energy efficiency success by supporting the adoption of robust building codes and appliance standards at the local, state and federal levels, and pursuing improved compliance with adopted standards. As such, C&S' work is directed at code setting bodies such as the California Energy Commission (Energy Commission), Department of Energy (DOE), and American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), or entities that produce data or ratings referenced by codes and standards, as well as those in compliance-related professions.

The vision for C&S 2.0 efforts is as follows:

- **C&S 2.0 is an expansion of the old C&S effort. C&S efforts will add new components and emphasize increasing primary research to inform code choices.** Expansions include:
 - Increased emphasis on coordinated long-term planning to reach deeper and have a more deliberate approach to meeting policy goals.
 - Increased primary data collection (and coordination with Emerging Technologies (ET)) aimed at strengthening cost effectiveness and feasibility arguments.
 - Targeted compliance efforts and development of electronic compliance infrastructure.
 - Code readiness activities, and "Code-Directed Industry Transformation (CDIT)," to increase the speed by which we adopt codes and standards.²
- **C&S will consider multifaceted objectives** California's statewide goals are diverse in scope, including targets over the next 35 years for energy efficiency, demand reduction, renewable energy, onsite generation, grid connectivity, demand response, energy storage capacity, ZNE buildings, water efficiency, and alternative fuels vehicles. To contribute, C&S must be designed and implemented with these multifaceted objectives in mind. Energy efficiency will continue to be the foundational goal of C&S initiatives, but PAs will also engage in other statewide goals (e.g., water management) that have an indirect, but strong, relationship with energy efficiency.
- **C&S efforts will accelerate the transition of measures into code by being pro-active, targeting interventions earlier in the process to advance energy efficiency faster (i.e., promote code adoption at the earliest feasible date).** The increase in coordination, enhanced primary research efforts, and PG&E's code readiness activities are all examples of how the C&S effort will accelerate the transition into code.

¹ NRDC's CA Golden Opportunity, p 15: <https://www.nrdc.org/sites/default/files/ca-energy-efficiency-opportunity-report.pdf>

² Note: Code readiness is applicable to PG&E local C&S efforts.

- **C&S efforts will be integrated with the other sectors in a multi-sector approach** that applies a systems perspective to the challenge rather than focusing on individual parallel solutions.
- **C&S efforts will advance CDIT³**, which includes intentional and specific activities executed to realize the outcomes expressed in D.09-09-047, which defined market transformation as “long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market.” The 2014 whitepaper by Prah1 and Keating described a preferred approach called “targeted market transformation initiatives” which they defined as “...interventions ... designed to induce sustained increases in the adoption and penetration of energy efficient technologies and practices through structural changes in the market and in behaviors of market actors”.⁴ The objective of applying CDIT to accelerate the adoption of new technologies earlier in the product life cycle is applicable for either definition, but especially fits the white paper’s description of initiatives.

Codes and Standards Goals

C&S and the other cross cutting programs are focused on supporting statewide policy objectives, such as the doubling of energy efficiency by 2030 and efforts to work towards ZNE buildings. Each of the cross cutting programs supports statewide goals in its own way. The vision states that **C&S does this by advocating for stronger building codes and appliance standards at the local, state, and federal levels, as well as supporting the compliance of those more efficient codes and standards.**

C&S’ specific goals are:

- Save energy (in particular **XXX** GWh across the state by 2025) and water, and reduce greenhouse gases through the adoption of new codes and standards at all levels (i.e., local reach codes, state, and federal)
 - This includes providing research that enables and supports state agencies responsible for achieving state policy goals
- Provide services that support and align with state policy objectives by:
 - Maintaining high compliance margins for whole buildings and appliances; and improving compliance margins for selected, high importance codes and standards
 - Increasing adoption of local reach codes that support the development and adoption of statewide and national code changes
 - Producing high-quality information and data to support CDIT, which aims to transition a measure or system (bundle of measures) into code during the early stages of the diffusion cycle⁵

³ CDIT is a feature of the “code readiness” strategy and activities, and applicable to PG&E only.

⁴ Prah1, Ralph and Keating, Ken. 2014. *Building a Policy Framework to Support Energy Efficiency Market Transformation in California*. <http://www.energydataweb.com/cpuc/home.aspx> p. 8

⁵ PG&E only

B. C&S Proposal Compared to Prior Program Cycles

Some of the key differences between past C&S efforts and proposed future efforts include: longer-term planning, more targeted compliance activities focusing in on high-impact areas and updating antiquated compliance processes, and the inclusion of code readiness activities⁶. Another core change for C&S 2.0 activities includes increased primary data collection and analysis. C&S plans to conduct primary research and analyses to support code and standards objectives and support state policy goals, guided by the CPUC, Energy Commission, and other state agencies goals, and long term tactical plans.⁷ Investment in primary research and data collection efforts accelerates the creation of well-supported code change proposals. C&S will collaborate with code setting entities to identify primary research areas that will be of highest value. Well-substantiated proposals submitted to code setting entities are more likely to proceed with success. The research and primary data collection will fill gaps identified through needs assessments, and will work in coordination with other efforts such as ET efforts. Primary research efforts will be tracked to monitor which research efforts lead to code setting action. This increase in primary research can be seen in several of the intervention strategies.

To meet the goals laid out in the vision, C&S has identified five major intervention strategies (*further detailed in Section G: Approach to Achieving Goals*) for C&S:

Long-Term Integrated Planning

Long term integrated planning incorporates an integrated dynamic approach to coordinate and align strategic planning within the energy efficiency portfolio. For PG&E, this strategy will also be used to identify “code readiness” priorities⁸ for the building and appliance code advocacy programs specifically. Current work in this area ensures the statewide program syncs with the objectives of other internal and external groups, such as incentive program managers and other organizations involved with code development.

- In the very near future, C&S will create a long-term tactical plan to determine strategies that focus on 2030 and 2050 GHG targets as well as dividing appliance advocacy into targeted efforts at the state and national levels.⁹
- In the near midterm future, C&S will increase its involvement in various California Air Resources Board (CARB), Energy Commission, and CPUC proceedings to ensure that C&S activities and opportunities are well understood amongst various stakeholders including transportation, water use reduction and other prioritized areas that have the most promise for success through use of codes and standards activities to support the long-term tactical plan.
- In the long term, the strategy will use the data collected through the program to continue to guide the subprogram to facilitate greenhouse gas reduction and energy efficiency.

⁶ PG&E only

⁷ PG&E is broadening the Code Readiness subprogram to include forward-looking research and analysis not included in CASE study development for existing or near-term rulemakings: field surveys that produce population data, tactical field surveys and studies aimed at specific building codes or appliance standards, lab testing, simulation models, tear-down analyses, collection of cost and other web data over time, amenity and human response to physical attributes, equipment operation, etc.

⁸ PG&E-specific

⁹ Descriptions of these subprograms and proposed activities are included in the Vision section of this document.

Advocacy to Support Building Codes and Appliance Standards

Advocacy activities develop proposals for building codes and appliance standards. Long-term experience is a significant benefit to this work given the need to anticipate areas of interest by code setting bodies, code complexity, and the necessary information for the rulemakings. For example, a deep understanding of the details in previous code cycles informs the next cycle and reduces the investment in developing new measures.

- In very near term, the statewide Building Code & State Appliance Standard subprograms will be separated from the local National (and possibly International) Standard subprogram. The National Standards program will work on Department of Energy (DOE) appliance standards and test procedure, multiple national (and possibly international, as applicable) agencies or organizations that develop mandatory or voluntary standards, test procedures, labels, and/or protocols that could directly impact California customers and goals.¹⁰
- In the near term, C&S plans to fund additional research to address current information gaps that limit its capacity to advocate for more efficient and simplified codes and standards.
- In the long term, the program research will be supported by accurate, statistically valid data that will enable well-written standards that enable compliance.

Code Readiness Activities¹¹

This new strategy focuses on introducing promising building systems and appliances to actors within various building industry supply chains¹² to determine whether they are ready for codification. PG&E will expand code readiness in collaboration with other programs in the following ways:

- In 2017 and beyond, C&S will conduct primary research and analyses that supports state policy goals, guided by CPUC, Energy Commission, and other state agency goals, and long term tactical plans.¹³
- In the near term, C&S will invest in a deliberate process by transitioning to codes and standards earlier in the product life cycle,¹⁴ or CDIT. This will allow PG&E to invest in portfolio infrastructure to gradually transition away from traditional incentive programs while continuing to move the market towards more efficient technologies and systems. PG&E will measure

¹⁰ These includes, but are not limited to, American Society of Heating, Refrigerating, and Air Conditioning Engineers (model building codes, such as ASHRAE 90.1 and 189.1), International Code Council (model building codes, such as the International Energy Conservation Code and the International Green Construction Code), the Environmental Protection Agency (ENERGY STAR labels), the Federal Trade Commission (EnergyGuide labels), Institute of Electrical and Electronics Engineers (e.g., IEEE 802.3 Energy Efficient Ethernet), International Electrotechnical Commission (test procedures), etc.

¹¹ CPUC approved a new *Code Readiness for PG&E local C&S subprogram for 2016*.

https://www.pge.com/notes/rates/tariffs/tm2/pdf/GAS_3656-G.pdf

¹² Here we will leverage the Compliance Improvement subprogram training platform (e.g., Energy Code Ace).

¹³ PG&E is broadening the Code Readiness subprogram to include forward-looking research and analysis not included in CASE study development for existing or near-term rulemakings: field surveys that produce population data, tactical field surveys and studies aimed at specific building codes or appliance standards, lab testing, simulation models, tear-down analyses, collection of cost and other web data over time, amenity and human response to physical attributes, equipment operation, etc.

¹⁴ The *Naturally Occurring Market Adoption (NOMAD)* curves from past C&S impact evaluations provide evidence that this is not only feasible but has been the case for many past codes and standards. For example, many adoption points have occurred at less than 10% market share, resulting in quicker savings and quicker market transformation. Code officials can rely on data from targeted projects (e.g., hundreds instead of thousands) as long as the measure or system is demonstrated as *cost-effective* and *feasible*.

ongoing progress towards CDIT.¹⁵

- In the midterm, PG&E will conduct primary research and analyses that support the long term tactical plans.¹⁶ Investment in primary research and data collection efforts supports and accelerates the creation of well-supported code change proposals.
- In the long term, the strategy will expand collaboration with voluntary programs to develop specific targeted program offerings based on code readiness projects and future C&S objectives.

Technical Assistance to Local Governments to help them Adopt Reach Codes

This strategy has traditionally included technical support for local governments interested in adopting ordinances that exceed the state building energy codes: Title 24, Part 6. This resulted in the development of cost effectiveness reports that local governments use to adopt ordinances that can be submitted to the Energy Commission for approval, and filed with the Building Standards Commission (BSC). As local governments are increasingly focused on reducing greenhouse gas (GHG) emissions, interest expands beyond the standard performance-based reach codes. The reach codes program will expand to include support for ordinances requiring measures beyond traditional energy efficiency measures including voluntary standards, renewable energy, alternative fuels vehicle infrastructure, energy storage, demand response, and water saving measures.

- In the near term, the strategy will be to educate local elected officials and staff regarding the value of reach codes, and help prepare cost-effectiveness studies that support the CAL Green Voluntary Tier rulemaking process; as well as develop comprehensive ZNE reach codes.
- In the longer-term, the strategy will support the development of tools to support local jurisdictions as they track, quantify and report reach code energy saving and greenhouse gas reductions and align programs with reach measures.

Compliance Improvement Activities

These activities complement advocacy work by ensuring potential savings from codes and standards are realized and persist over time. This strategy targets market actors throughout the entire compliance supply chain, providing technical support, education, outreach, and resources to improve compliance with both building and appliance energy standards.

- In the near term, this strategy will work to help market actors understand codes and standards, and provide role-based trainings to improve compliance particularly for the areas that have the highest potential impacts.
- In the longer-term, this strategy will support the development of an electronic repository to

¹⁵ For example, conduct an initial survey in 2016-17, execute strategies for several years, and then conduct regular follow-up surveys (e.g., every 5-10 years) to establish portfolio savings and statewide progress. Metrics will expand to include progress towards state policy goals.

¹⁶ Code Readiness is specific to PG&E. PG&E is broadening the Code Readiness subprogram to include forward-looking research and analysis not included in CASE study development for existing or near-term rulemakings: field surveys that produce population data, tactical field surveys and studies aimed at specific building codes or appliance standards, lab testing, simulation models, tear-down analyses, collection of cost and other web data over time, amenity and human response to physical attributes, equipment operation, etc.

track repeated patterns of non-compliance as well as software tools to ensure accurate monitoring and reporting of compliance.

Key Learnings from Recent EM&V Reports of California's Codes and Standards Programs

Past evaluations have focused on Building Codes, Appliance Standards and Compliance Improvement, with evaluation recommendations restricted to these subprograms. The following summary of recommendations has been adapted from findings in the *2010-2012 C&S Impact Evaluation*¹⁷, and the *Codes and Standards Compliance Improvement Program Years 2013-14 Process Evaluation Final Report*¹⁸.

Building Codes & Appliances Standards Advocacy

- A major challenge in program evaluation has been the lack of program documentation typical to other energy efficiency programs. A living document that tracks areas for improved evaluation methods and documentation would support ongoing improvement to evaluation practices.
- Building envelopes present IOUs with opportunities for intervention, as they also stood out as a major building component that in the total for all sites was just below 2008 code requirements.
- IOUs should continue their appliances standards work, as appliance standards compliance has been high (typically 80+%).

Compliance Improvement

- IOUs have made noticeable progress with the development and improvement of the Energy Code Ace (ECA) website, which provides code compliance trainings and resources to building industry professionals.
 - While building professionals identified increasing awareness of the tool opportunities exist for improvement as trainings are slowly evolving to become more specific and targeted to user needs.
 - C&S can continue this progress by identifying code areas that are particularly vulnerable to noncompliance and tailoring trainings to continually highlight and target those areas.
- Although in-person trainings have been well-received, building industry professionals are less likely to attend. IOUs can tap into the remote training market by expanding online ECA training.
- IOUs can use external partnerships to make training materials and links available on other industry sites where professionals are known to seek information and support.
- IOUs have an opportunity to increase code compliance by providing education to counter perceptions that code compliance is unmanageably complex.

¹⁷ Cadmus, DNV GL. 2014. *Statewide Codes and Standards Program Impact Evaluation Report for Program Years 2010-2012*. http://calmac.org/publications/CS_Evaluation_Report_FINAL_10052014-2.pdf

¹⁸ DNV GL. 2016. *Codes and Standards Compliance Improvement Program Years 2013-14 Process Evaluation Final Report*. http://calmac.org/publications/ComplianceImprovementImpactEvaluationDraftReport_FINAL-OUT.pdf

C. Sector-Level Budget

Over the 10 year period, C&S is proposing to spend **x** dollars to achieve savings of **x** GWh, **x** MW, and **x** MM Therms. Potential savings by year are shown in Table 2 and budgets by year are shown in Table 1.

(Table 1 TBD)

D. C&S Annual Net Savings from 2015 Potential Study

TBD

E. C&S Landscape

C&S affect many stakeholders in the building industry supply chain. Appliance standards impact all customers who purchase regulated products. Considering this, the influence of C&S has an effect on virtually all customers. With respect to advocacy engagement, priority stakeholders include those who can affect the success of standards in the rulemaking process and through implementation. See appendix D for a more fulsome list of key C&S customers and stakeholders.

a. Trends

C&S sees several key trends affecting statewide C&S initiatives:

- **Increasing CPUC emphasis on Codes and Standards** – During the last several years, the CPUC has communicated the importance of codes and standards.^{19,20,21} Additionally, under the Warren-Alquist Act, the Energy Commission expects IOUs to support building standards.²² These agencies recognize the central role that codes and standards must play in achieving state policy goals, and C&S 2.0 takes significant steps towards meeting these expectations. Given the discussion above on California’s climate policies, this increasing emphasis on C&S is understandable.
- **Increasing number of state policy drivers** – California has a growing number of energy- and climate-related policy goals, expressed in Executive Orders, legislative bills, and state agency action plans (see Figure 1 below for selected goals).²³ The CPUC has indicated the California’s publicly-funded energy efficiency programs are an integral part of the state’s fight against climate change and greenhouse gas reductions.²⁴ California’s statewide goals are diverse in scope, including targets over the next 35 years for energy efficiency, demand reduction, renewable energy, onsite generation, grid connectivity, demand response, energy storage capacity, ZNE buildings, water efficiency, and alternative fuels vehicle. To contribute, C&S must be deployed holistically with these multifaceted objectives in mind.²⁵ The C&S 2.0 framework prioritizes these goals in all planning and implementation.

¹⁹ CPUC D.12-05-015, pg. 246.

²⁰ CPUC D.12-05-015, pg. 249.

²¹ CPUC. “Regulating Energy Efficiency: A Primer on the CPUC’s Energy Efficiency Programs.” February 2016.

http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/Fact_Sheets/English/Regulating%20Energy%20Efficiency%200216.pdf.

²² Warren Alquist Act section § 25402.7. Utility support for building standards

²³ For a more comprehensive review of state policy goals see:

- Greenblatt, J. 2015. "Modeling California Policy Impacts on Greenhouse Gas Emissions." Energy Policy 78: 158-72. Accessed December 2016. <http://eetd.lbl.gov/publications/modeling-california-policy-impacts-on>.

California Air Resources Board. “2030 Target Scoping Plan Concept Paper” Appendix A. June 17, 2016.

https://www.arb.ca.gov/cc/scopingplan/document/2030_sp_concept_paper2016.pdf

²⁴ Pat Eilert, Pacific Gas and Electric Company, Eric Rubin, Alex Chase, Energy Solutions, Yanda Zhang, YDZ Energy, “Codes and Standards Climate Strategy,” 2016, ACEEE Summer Study.

²⁵ Pat Eilert, Pacific Gas and Electric Company, Eric Rubin, Alex Chase, Energy Solutions, Yanda Zhang, YDZ Energy, “Codes and Standards Climate Strategy,” 2016, ACEEE Summer Study.

	2020	2025	2030	2050
Greenhouse Gases	1990 levels (AB 32)		40% below 1990 levels (SB 32)	80% below 1990 levels (E.O. B-30-15)
Efficiency			2x energy efficiency goals ¹	
Zero Net Energy Buildings	100% of new Res. ²	100% of new state buildings ²	100% of new Com., 50% Com. Retrofits ²	
Renewable Portfolio Standard	33% ³		50% ¹	
Transportation		1.5 million ZEVs ⁴		
Fuels			Displace 30% of petroleum use with alternative fuels ⁵	
Water	20% less water per capita in Res. & Com. buildings ⁶			
High-GWP Gases	Reduce GHG emissions from HFCs by 10 MMtCO ₂ e ⁷			
Energy Storage	1.3 GW Storage Procurement ⁸			

1. Senate Bill 350
2. CA's Long Term Energy Efficiency Strategic Plan
3. Senate Bill X1-2
4. Governor's ZEV Action Plan
5. Assembly Bill 1007
6. Senate Bill X7-7
7. AB 32 Scoping Plan (CARB)
8. CPUC D.10-03-040

Supporting Agencies



Figure 1 Select California Policy Goals

- **Evolving and variable state and federal activities** – State and national regulatory agencies are subject to funding Energy Commission fluctuations, which will impact their efforts towards greater energy efficiency. Over the next ten years, priorities at the state national level may evolve, requiring flexibility and nimbleness in how California executes its C&S strategies. PAs' consistency in C&S support allows California to achieve its state policy objectives despite evolving state and federal funding priorities.
- **Increasing requirements for rigorous data to support Energy Commission rulemakings** – Statewide C&S initiatives support the Energy Commission in their various rulemakings by providing data that building or manufacturing industries demand to support underlying cost or benefits calculations. The Energy Commission relies on statewide C&S activities to provide useful and accurate data. In addition to energy savings, the Energy Commission increasingly considers pricing information and technology readiness, user amenity and how the measure will

be applied in practice in buildings and equipment.²⁶ Verifiable qualitative analysis is needed to respond to these needs as well.

- **Rising Miscellaneous Electrical Loads (MELs) require evolving processes** – To achieve ZNE in California, special attention must be given to miscellaneous electrical loads (MELs) and plug-in electric vehicles (PEV). Many types of MELs have a relatively shorter product cycle (e.g., cell phones, tablets, smart watches, etc.), so these MELs cannot be effectively managed by the DOE’s existing energy efficiency rulemaking process which can take up to ten years.²⁷ Furthermore, determining the annual energy consumption, energy usage patterns, and product cycles of these MELs would require sizable resources. We need to explore different paths to transform the market for MELs with a shorter product cycle, in addition to supporting new appliance standards.
- **Increasing focus on existing buildings²⁸** – The code for new construction is rapidly approaching ZNE targets for residential buildings, with nonresidential goals following closely behind. As such, existing buildings offer an excellent opportunity for savings. In particular, dramatic increases in the energy efficiency of appliances and system solutions in existing buildings are necessary to achieve Senate Bill (SB) 350 *Clean Energy and Pollution Reduction Act of 2015* goals to double energy efficiency of existing buildings by 2030. However, retrofitting existing buildings have challenges, including a broad variety of project types, design and construction arrangements, and constraints caused by existing conditions. Existing buildings’ efficiency may be improved through code enhancement proposals focused on building alterations and inefficient appliances. In addition, compliance improvement efforts are especially important to ensure the intended savings are fully realized.

b. Gaps/Barriers

The trends outlined offer insight into the gaps that exist between the needs of the end customer and what is available to fill them. To overcome these barriers, a range of activities—from policy changes to process improvements—are needed.

- **Lack of consistency across state policies and holistic long-term planning to meet those goals** – Disconnects or variances in goal language between multiple well-intending state policies present barriers to integrated implementation. For example, ZNE goals stated in the CLTEESP do not fully align with the GHG reduction goals of AB 32 in terms of metrics, measurement, and milestones. Energy Commission’s building energy standards (Title 24, Part 6) include the scope to accommodate a robust set of integrated requirements for renewable generation, and energy storage/demand response. However, IOU funding for energy efficiency and other distributed energy resources (DER) efforts are authorized in separate proceedings, which can inhibit seamless advocacy efforts across DER.

²⁶ For a more in depth discussion, see “Codes and Standards: A Path to Affordable Amenity and Customer Satisfaction.” Jon McHugh, Alex Chase, Gary Fernstrom, Mike McGaraghan, Chad Worth, and Pat Eilert. 2016 ACEEE Summer Study on Energy Efficiency in Buildings Proceedings. August 2016.

²⁷ The Energy Commission’s process is a faster, 3-4 years but we need to get the process from research to adoption down to a couple years to achieve the best standards.

²⁸ http://www.energy.ca.gov/ab758/documents/ab_758_bill_20091011_chaptered.pdf

- For Southern California IOUs, additional stringent air quality requirements for reduced NOx and particulate matter in non-attainment areas have been difficult to reconcile, as it conflicts at times with efficiency of stationary sources.
 - C&S believes the greatest impacts will come from looking across policy drivers and broad DER areas, as well as across technologies. As an example, achieving ZNE for new and existing buildings while maintaining transmission and distribution (T&D) grid stability benefits from the flexibility brought about by the integration of various systems in buildings and communities, integration of photovoltaic (PV) and battery storage, and expansion of demand response and alternative fuels and electric vehicle (EV) infrastructures. Moreover, with rapidly approaching ZNE goals and relatively short code cycles, this work must accelerate.²⁹
 - C&S' long-term tactical planning efforts will improve coordination across programs, accelerate code readiness activities, and transfer knowledge learned from those activities to targeted industry actors.³⁰
- **Data deficits** – C&S has found that most, if not all, rulemakings end in compromise between code setting bodies and industry representatives, and the amount of compromise by DOE or Energy Commission staff depends on the quality of data available to defend a proposed rule. Since code setting bodies such as the Energy Commission and DOE are required to show cost effectiveness and feasibility of proposed standards, successful advocacy efforts are built on defensible, current and rigorous data. However, because many industry representatives consider their data associated with their products to be confidential (cost data, in particular), most useful data is derived from research conducted by either the code setting body or IOUs.
 - Defending a proposed rule requires information that demonstrates the viability of the technology and its role in energy efficient systems, especially as technologies advance to where they are ready to be codified. Beyond this basic viability, though, C&S has found a lack of data that is accurate and useful on the performance of newer technologies as well as a lack of thorough understanding of the impact of widespread adoption on the intended system, both areas that are critical for setting of new codes. This need can be filled by increased population data, technical research, and market analyses that are directly related to a public rulemaking conducted by the Energy Commission or DOE.
 - **State resource constraints** – Developing code change proposals, gathering stakeholder input, designing compliance processes and offering resources to support the implementation of California's codes and standards is a resource-intensive process. Code setting entities, such as the Energy Commission, have relied on stakeholders to contribute code change proposals and to participate in the rulemaking process. Insufficient resources exist for state agencies to conduct all the supporting activities necessary to evolve state standards in pursuit of policy goals. Since 2002, the IOUs have submitted many Codes and Standards Enhancement (CASE) reports and developed a supportive Compliance Improvement subprogram to assist with resource shortfalls.

²⁹ For a more in depth discussion, see "Putting it All Together: Leveraging Codes and Standards to Accelerate Integration of Demand-Side Resources." Heidi Hauenstein, Aimee Beasley, Christopher Uraine, Chad Worth, Stu Tartaglia, and Mary Anderson. 2016 ACEEE Summer Study on Energy Efficiency in Buildings. August 2016.

³⁰ Working across teams, especially with those that are investing in program strategies that look at systems rather than system components, will result in broadly applicable results.

- **Federal preemption** – DOE has a program to develop federal appliance standards. As the scope of DOE’s appliance program expands, it becomes increasingly important for California’s C&S initiatives to meaningfully participate in the federal rulemaking process due to “federal preemption.”³¹ California often desires to have higher minimum standards than the federal standards. For example, after commercial clothes washer standards (first adopted by California in Title 20 in 2003) became federally covered products through EAct 2005, California could no longer update standards beyond federally adopted efficiency criteria for commercial clothes washers. Federal law includes an option for states to petition DOE for a preemption waiver, but no state has successfully done so and it is not considered a practical option. As such, as DOE’s appliance program expands, fewer appliances are available to the Energy Commission to incorporate into Title 20. Thus, efforts must be both focused on the federal level and on completing California adoption of energy efficient standards quickly with the highest levels of efficiency to transform the market as far as possible to set a high bar before the DOE begins its rulemaking process for those appliances. This is a particularly serious issue. The DOE process is much longer than the Energy Commission’s process, stranding cost effective energy savings that could contribute to achieving California’s policy goals.
- **Local governments lack awareness about which reach codes can help them achieve their goals, and lack the resources needed to adopt reach codes** – A “reach code” is a locally mandated code or alternative compliance path that is more aggressive than the current California Building Energy Efficiency Standards, resulting in buildings that achieve higher energy savings. In California, the unique authority given to cities and counties to adopt reach codes allows local jurisdictions to aggressively pursue their local Climate Action Plan goals as well as the CPUC’s goal of achieving ZNE for all new residential construction by 2020 and for all new nonresidential construction by 2030. Reach codes play an important role in ZNE by providing an opportunity to test advanced energy efficiency building practices with designers, building owners, plan examiners, field inspectors, and other development stakeholders. Further, reach code measures work in tandem with utility energy efficiency program incentives designed to accelerate market acceptance and adoption of ZNE building energy practices.

 - Every local government must determine the type of reach code ordinance best suited for meeting its unique GHG reduction goals.³² However, local governments may lack the awareness, knowledge and resources needed to develop and adopt these codes. Typically, this includes deciding whether to adopt “performance based”³³ CAL Green Energy Efficiency Tiers such as exceeding base code by 15%, mandate “prescriptive”³⁴

³¹ Federal preemption is the invalidation of any state law that conflicts with federal law; and for appliance efficiency regulations, the effect of minimum federal standards is to cap state appliance standards. Federal law includes an option for states to petition DOE for a preemption waiver, but no state has successfully done so and PG&E does not consider this a practical option.

³² Cadmus, DNV-GL. 2014. Reach Code Subprogram 2010-2012 Process and Pilot Impact Evaluations. pp. 2-6

³³ CAL Green (Title 24 Part 11) identifies several voluntary Tiers requiring “performance-based” energy code compliance thresholds that exceed the Title 24 building energy efficiency standards by a certain percentage (e.g., 15%). The performance approach allows considerable flexibility in the way that designers and builders can customize the set of energy measures that are best suited to the project’s needs and characteristics, provided the building energy performance meets or exceeds the minimum requirements.

³⁴ Prescriptive-based requires installing specific Title 24 building energy measure(s) such as cool roofs, lighting, hot water distribution systems, water efficiency, and/or commercial kitchen applications.

energy efficiency measures such as cool roofs, and/or require “renewable energy”³⁵ installation such as solar photovoltaic systems. State law³⁶ requires that “local governmental agencies wishing to enforce locally adopted energy conservation standards” shall submit a study with supporting analysis to the Energy Commission showing how the local government determined energy savings and cost effectiveness and local governments are often limited in their ability to meet this requirement. Through technical assistance, PG&E supports local governments in their efforts to adopt reach codes.

- **Inadequate or absent compliance infrastructure and burdensome compliance processes**—California’s collective investment in a modernized electronic infrastructure to increase the efficiency of the compliance process for Title 24, Part 6 has been slow and, without this modernized infrastructure in place, the perception of the compliance process as a time consuming and paper-heavy endeavor persists.³⁷ Moving away from the current forms framework and transitioning to a streamlined compliance process, including the potential creation of registries, databases and other electronic infrastructure, will take a significant investment, but C&S believes that improving this infrastructure, and developing easy to use compliance tools and processes, is critical for enabling increased compliance.
 - In addition, compliance software functionality and usability has had new challenges over the past two building code cycles. With the recent rapid increase in complexity, breadth, and stringency of the building codes, the compliance software had challenges keeping pace. This has been in part due to the replacement of the simulation engine from the two-dimensional building modeling DOE 2 program (no longer supported by the DOE) to CBECC-COM, a software engine using a three dimensional user interface that uses and underlying engine based on Energy-Plus. While the EnergyPlus software engine is a more capable tool that can better simulate advanced building technologies, the transition was not entirely smooth and caused delays in the implementation of the standards.
 - Another key concern is the gap in understanding between the compliance software results which are an “asset rating” of a building and the actual operation or performance of a building. This issue has been increasingly problematic as a code compliant ZNE building does not necessarily reflect actual ZNE operation where many consumers and building owners are expecting ZNE code buildings to have a zero energy bill.
 - Achieving the state’s goal of ZNE for all newly constructed commercial buildings by 2030 will require significant advancements to the energy code and buildings will need to employ compliance software tools that offer new functionality to allow design projects to analyze these advanced strategies and demonstrate that projects meet the ZNE goals.

C&S strategies seek to overcome these key barriers, as explained in greater detail in *Section F, Approach to Achieving Goals*, below.

³⁵ Mandating installation of renewable energy measures does not necessarily require following California’s Preferred Loading Order: energy efficiency, demand response, renewables, and distributed generation.

³⁶ Section 10-106 of the California Code of Regulations, Title 24, Part 1, Article 1

³⁷ Compliance Improvement Advisory Group: <http://www.caciag.com/Issues>

F. Approach to Achieving C&S Goals

Under C&S efforts, five core intervention strategies exist:³⁸

- Long-term Integrated Planning and Collaboration
- Advocacy for Building Codes and Appliance Standards at All Levels
- Technical Assistance for Local Government to Develop and Pass Reach Codes
- Compliance Improvement Activities
- Code Readiness Activities

Intervention 1— Long-term Integrated Planning and Collaboration

Foundational to C&S’ efforts is long-term planning and collaboration. Many efforts in California are neither coordinated nor integrated at the level needed to address state policy. Long-term integrated planning is needed to develop and implement an integrated dynamic approach to achieving state policy goals and maximize energy savings. Integrated planning envisions what the future building stock and appliance market would be in a world that achieves the State’s energy, water and GHG goals and coordinates a plan that achieves these goals.

The outcome of this effort will be a long-term tactical plan for specific codes and standards activities that support state policy goals. Through this planning, C&S expects to see improved alignment with external stakeholders engaged in codes and standards to improve advocacy. A well-coordinated effort with internal stakeholders would be expected to capture DER synergies and maintain grid reliability.

Table 1. Long-term Integrated Planning and Collaboration

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
Long-term integrated planning and collaboration 	Lack of consistency across state policies and holistic long-term planning to meet those goals	Deconstruct major policy goals such as, specific code objectives and program activities (e.g., the 2030 ZNE Commercial Building goal: achieve ZNE for warehouses in 2022 T24 code cycle, ZNE low rise office buildings during the 2025 T24 code cycle etc. AB758: billing analysis or building rating required for every entry into MLS database before posted for sale)	N	S
		Develop model to estimate potential	N	S

³⁸ Advocacy strategies are delivered statewide, per D.16-08-019.

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
		impacts of each major portfolio element relative to forthcoming code changes and applicable state policy goals.		
		Lead the development of 5-15 year tactical plans, in collaboration with IOU program teams, the CPUC, Energy Commission, HCD, BSC and CARB, which are designed to achieve specific code objectives.	N	S,M
		Explore different paths to transform the market for MELs with a shorter product cycle, in addition to supporting new appliance standards.	N	S,M

Partners:³⁹ Other internal groups outside of the energy efficiency portfolio: distribution, transmission, distributed generation, electric vehicles, demand response, storage, etc.; Agencies and code-setting entities: CPUC, Energy Commission, CARB, DOE, ASHRAE, ICC; Municipal utilities and organizations: SMUD, LADWP, SCPA, NCPA; External progressive utilities and other entities: NEEA, National Grid, Arizona Public Service, West Coast Collaborative, etc.

Intervention 2 –Advocacy for Building Codes and Appliance Standards at All Levels⁴⁰

At the core of C&S activities are advocacy efforts. These efforts reach multiple levels of decision making, across both building codes and appliance standards. Specifically, advocacy efforts include strategies to change:

- State Building Codes:** A State Building Codes strategy is needed to influence proceedings conducted by the Energy Commission and other State agencies. Since building codes determine the efficiency of new buildings, additions, and changes to existing buildings that trigger a permit, they directly influence building design and construction as they relate to ZNE goals. The scope of Title 24, Part 6 has expanded over time to control plug loads, outdoor lighting and some industrial process equipment. The relatively new Title 24, Part 11 Green Building Standards covers water efficiency including site irrigation, building materials, and provision for electric vehicle charging.

³⁹ C&S engages with many different stakeholders and partners. Thus, the “Partners” section within each subprogram table is non-exhaustive.

⁴⁰ Advocacy strategies are implemented statewide, per D.16-08-019

- **State Appliance Standards:** The State Appliance Standards strategy is needed to influence rulemakings conducted by the Energy Commission to improve the efficiency of appliance in California. Since appliance standards cover the sale of appliances within the political boundaries of California and impact efficiencies of equipment in both new and existing buildings, they are a powerful policy tool for saving energy and reducing GHG emissions. Appliance standards are enforced by the Energy Commission through the appliances database and occasional monitoring of products sold into the California market. Appliance standards are also referenced by the building standards and enforced by building officials in the 500+ California jurisdictions.
- **National Codes and Standards:** This strategy is needed to influence a broad range of national building codes and appliance standards that impact California regulations. For example, Federal Appliance and Equipment Standards, which are embodied in Title 20, have grown to cover products representing about 90% of home energy use, 60% of commercial building energy use, and 30% of industrial energy use.⁴¹ Hence, federal appliance standards are often the strongest policy tool for reducing energy use in existing buildings and a large part of achieving ZNE in both new and existing buildings. In addition to DOE appliance standards and test procedures, multiple national agencies or organizations exist that develop mandatory or voluntary standards, test procedures, labels, and/or protocols that could directly impact California customers and goals.⁴²

Advocacy efforts strive for the adoption of cost effective measures which maximize energy savings and reduce environmental impacts. Advocacy efforts increased energy savings for the state—filling the gap described earlier—in pursuit of ZNE and SB 350 policy goals for residential and nonresidential buildings.

⁴¹ DOE. (Accessed September 10, 2016).

<http://energy.gov/eere/buildings/appliance-and-equipment-standards-program>. Values are national estimates.

⁴² These includes, but are not limited to, American Society of Heating, Refrigerating, and Air Conditioning Engineers (model building codes, such as ASHRAE 90.1 and 189.1), International Code Council (model building codes, such as the International Energy Conservation Code and the International Green Construction Code), the Environmental Protection Agency (ENERGY STAR labels), the Federal Trade Commission (EnergyGuide labels), Institute of Electrical and Electronics Engineers (e.g., IEEE 802.3 Energy Efficient Ethernet), International Electrotechnical Commission (test procedures), etc.

Table 2. Advocacy for Building Codes and Appliance Standards

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
<p>Advocacy for Building Codes and Appliance Standards to maximize energy savings</p> 	State resource constraints	Lead the creation of detailed CASE proposals for agreed upon topics of interest to the California Energy Commission and other code setting bodies.	E	S,M,L
		Lead a general review of test procedures used to determine performance of appliances for federal and state standards.	N	S
		Expand research and analyses to improve the quality of data included code change proposals. ⁴³	M	S,M,L
	Data deficits	Provide research and analysis for measures such as water use, building materials, ventilation, and source pollutants.	M	S,M,L
	Federal preemption	Provide market analysis and gather high-quality market data, usage patterns and product performance to inform code change proposals.	M	M
	Proactively engage and foster improved working relationships with a broader range of affected stakeholders and recruit them to directly communicate to the Energy Commission and participate in rulemakings.	N	M	
	Proactively enhance regulations to include DR requirements, grid connectivity, etc. and enable the plug and play grid.	N	M	
	Improve quality of information supplied to the	N	M	

⁴³ Research may include a variety of activities: field surveys to collect population data; collection of internet data to determine costs, availability, performance, and compliance; tactical surveys on specific technologies, industries, markets, behavior, and satisfaction; lab tests, etc. Research will be conducted in multiple subprograms and there will be some overlap. While most data collection and market analysis aimed at long term code objectives will be conducted out of the code readiness subprogram, codes and standards research on specific measures and building types for open or near-term rulemakings will continue be conducted in other subprogram areas: California Building Codes, California Appliance Standards, and National Regulations. Additionally, support for Reach Codes will continue to include research in various areas.

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
		Energy Commission for their interactions with federal agencies		
		Actively participate and influence the development and updating of test methods and ratings with industry groups (NEMA, AHRI, etc.), technical committees (ASHRAE, IES, IEEE, etc.) voluntary programs (DLC, CEE, EPA/ENERGY STAR, etc.), and regulatory agencies (DOE, ICC, etc.).	M	S,M

Sectors: Residential, Commercial, Industrial, Public, ET, Other: DR

Partners: Code-setting entities: California Energy Commission (Energy Commission), Building Standards Commission (BSC), Housing and Community Development (HCD), California Air Resources Board (CARB), State Fire Marshall (SFM); Code enforcement community members (CALBO, CSLB); IOU Energy Efficiency Programs; National Building Code Development Entities: ICC, ASHRAE, IAPMO, NFPA; Standards Setting entities: ASHRAE, ICC IES, ASTM, ENERGYSSTAR, IAPMO; Manufacturing community representatives; Design and construction community members; Municipal utilities: SMUD, LADWP; Compliance software developers; Simulation software developers (e.g. DOE EnergyPlus developers: DOE, NREL, LBNL); Energy efficiency and Demand Response advocates

Intervention 3— Technical Assistance for Local Government to Develop and Pass Reach Codes

The Reach Codes strategy is needed to support local jurisdictions which aspire to exceed state building codes. Reach codes are often part of a local government’s climate action plan or other green strategy. IOU support includes development of cost effectiveness studies per Climate Zone, drafting of model ordinance templates for regional consistency, developing compliance support tools (such as a Carbon calculator) and assisting with the reach code application process. These reach codes provide crucial experience for understanding the implementation issues associated with a new code before it is rolled out on a statewide basis when these measures are adopted into Title 24, Part 6 or the mandatory portion of CALGreen.

Recently, local governments have become increasingly focused on reducing greenhouse gas emissions. Many local governments have recently requested technical support from the Reach Code subprogram to provide cost effectiveness studies for non-energy efficiency measures such as photovoltaic systems, alternative fuels and electric vehicle infrastructure, energy storage, demand response, and water saving measures.

Through Reach Codes C&S collaborates with the Energy Commission and Local Government Partnerships (LGPs) to identify and provide technical assistance to local jurisdictions interested in adopting Reach Codes. This includes preparing cost effectiveness studies per climate zone, drafting of model ordinance templates for regional consistency, and assisting with the reach code application process.

The outcomes of this technical assistance will be additional reach codes that are developed and adopted by local governments to help reach higher levels of energy efficiency and GHG reduction, and prepare the building industry for more stringent building codes to advance ZNE.

Table 3. Technical Assistance for Local Government to Develop and Pass Reach Codes

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
<p>Technical assistance for local governments to develop and pass reach codes</p> 	<p>Local governments lack awareness about which reach codes can help them achieve their goals, and lack the resources needed to adopt reach codes</p>	<p>Lead development of tools in collaboration with local jurisdictions that can track, quantify, and report reach code energy savings and greenhouse gas reduction.</p>	E	M
		<p>Support coordination between Energy Commission, BSC and HCD staff to leverage Title 24 Part 11 CAL Green Voluntary Tiers as a primary source for reach code measures by preparing cost effectiveness studies that support the CAL Green Voluntary Tier rulemaking process.</p>	M	S
		<p>Support local initiatives to improve efficiency in existing residential buildings such as Home Energy Score (HES) upon resale or on a voluntary basis, Green Multiple Listing Service (Green MLS), or mandatory energy disclosure (billing data or HES rating disclosed on MLS).</p>	N	M
		<p>Support collaboration efforts with Energy Commission, regional energy networks, local government partnerships, regional public affairs, and other stakeholders to educate local elected officials and staff regarding the value of Reach Codes, the requirements for adoption of local Reach Codes and best practices, tools and resources available to help local implementation.</p>	M	S
		<p>Develop a comprehensive ZNE reach code that integrates energy efficiency, renewables, alternative fuels and electric vehicle infrastructure, energy storage, demand response, and water saving measures with prescriptive measures for each targeted area.</p>	N	S
		<p>Coordinate with energy efficiency programs such as Savings By Design to align programs with reach code measures.</p>	M	S,M
		<p>Sectors: Public, Commercial, Residential Partners: Code-setting entities: California Energy Commission; IOU Internal Programs: Local Government Partnership Program; State and local governments; Code enforcement community; IOU Statewide C&S Team</p>		

Intervention 4— Compliance Improvement Activities

Compliance improvement activities help to ensure that potential savings from building codes and appliance standards are realized and persist over time. Activities conducted in support of this strategy target market actors throughout the entire compliance supply chain by providing needs-based tools, training, resources and outreach.

Through compliance improvement activities, critical market actors will better understand their unique role in compliance, and will be equipped with the specific knowledge, skill, and tools that they need to quickly, easily, and effectively perform their compliance job tasks. Ultimately, the outcomes of the compliance improvement activities will be higher compliance rates with building and appliance efficiency standards to help realize the full potential of adopting codes and standards.

Table 4. Compliance Improvement Activities

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
Compliance improvement activities 	Inadequate or absent compliance infrastructure and burdensome compliance processes	Develop and implement role-based training that teaches market actors how to perform their unique compliance job tasks	E	S
		Develop tools and resources that help market actors understand codes and standards, and reduce burdensome processes	M	S
		Develop training using the appropriate modalities per market actor	M	S
		Conduct outreach to increase awareness of the value of compliance with California’s energy standards and publicize the availability of tools, training and resources to support improved compliance	M	S
		Increase clarity and usability of codes by incorporating user-centered design in code development.	M	M
		Develop an electronic repository to track repeated patterns of non-compliance by builders and repeated errors by energy analysts. This data can be used to improve next version of code.	N	M,L
		Electronic repository provides feedback on common errors, which measures are used etc.	N	M,L

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
		This data can be used to improve next version of code.		
<p>Sectors: Residential, Industrial, Commercial, Public, WE&T, ET, Other: DR</p> <p>Partners: Code-setting entities: California Energy Commission, HCD, BSC; Other state agencies; Investor Owner Utilities: IOU Statewide C&S Team, Programs, WE&T, DR, Local Government Partnerships; Utilities: POU's and water districts; Code enforcement community; Design, construction, energy consultant community members; Manufacturing community representatives; State and local governments; Regional Energy Networks; Research community members; California's higher education institutions; Energy and sustainability non-profits</p>				

Intervention 5 – Code Readiness Activities⁴⁴

The Code Readiness strategy is a PG&E-specific intervention strategy. PG&E believes code readiness is needed to support code driven industry transformation, which aims to transition a measure or system (bundle of measures) into code during the early stages of the diffusion cycle, such as the innovator's stage. These efforts reach back to the earlier stages of a measure than the research conducted under the Advocacy intervention strategy. The measures explored through Code Readiness activities can be disruptive in that they challenge the legacy technologies by having major improvements in efficiency. The success of transitioning a specific measure or system into code is conditional on high quality information that provides compelling evidence of cost-effectiveness and technical feasibility as required by the Warren-Alquist Act. Code readiness includes "high touch" projects using PG&E experts and consultants that have well established reputations in their field for innovative excellence. Detailed code support data are collected (e.g., baseline, measure installation, energy efficiency performance, maintenance, and replacement). In addition, market data is collected such as construction feasibility data, customer satisfaction, impacts on the business models of project owners, designers, builders, and trades sub-contractors.

The Code Readiness activities have three objectives.

- The first objective is to produce high quality information and data (savings are not the initial priority) to support industry transformation. In 2016 this strategy was applied through PG&E's Code Readiness subprogram in three residential projects and one nonresidential project. PG&E's plan is to expand this area of work in 2017 and beyond.
- The second objective is to leverage a vast pool of C&S research (technology and market research, cost effectiveness, impacts on manufacturers, etc.) conducted by DOE, IOUs, Northwest Energy Efficiency Alliance (NEEA), and others, adding information garnered from industry representatives during negotiated rulemakings. This research can be used to accelerate

⁴⁴ Code Readiness activities are PG&E specific

the development of new measures for incentive programs, in particular, when there is a long delay between final rules and the effective dates of standards.

- The third objective is to improve primary data collection through field surveys, online data harvesting, and laboratory tests to increase the quality and effectiveness of advocacy efforts. Code readiness work will be closely coordinated with ET, with any C&S code readiness elements comprising a new, complementary source of innovation for the portfolio.

The primary outcome of code readiness activities is high-quality data sets for measures and systems needed to support specific codes and standards objectives and documents summarizing C&S research. Through this investment in robust data, PG&E will decrease the cost of future code enhancement proposals.

Table 5. Code Readiness Activities

Intervention Strategy	Barriers	Example Tactics	Existing, New, or Modified	Short, Mid, or Long-term
<p>Code readiness activities to gather data for future C&S proposals</p> 	Data deficits	Design and implement promising technology packages and systems to collect accurate, code-relevant data: enforceability, feasibility, and cost effectiveness. Support with various other tactics, including collection of costs and compliance from web data	N	S, M
		Conduct industry analyses to identify critical actors with whom to engage in projects and knowledge transfer	M	S
		Build a searchable and organized database from various sources (code readiness projects, program projects, etc.) to be used in future code enhancement proposals.	N	S,M
		Summarize codes and standards research and other information in a format that can be easily extracted to develop work papers.	N	S,M,L
		Conduct field surveys to collect population data, including detailed on-site audits and metering to determine equipment performance, load shapes, etc. Support with lab testing, tactical surveys, etc.	M	S,M,L
<p>Sectors: ET, Other: IOU Test Labs</p> <p>Partners: Incentive program staff; Equipment Manufacturers; Architects, Engineers, and Building Scientists; Builders and manufacturing partners; Residential and nonresidential building owners; Contractors</p>				

By sector, the top system and measure based code readiness opportunities as of 2016 are detailed in the tables below. Note that these systems and measures may change over time.

Figure 2. Top System Code Readiness Opportunities by Sector in 2016

Cross-cutting	Residential	Commercial
<ul style="list-style-type: none"> • Integrated variable speed devices: pumps, motors, and controls • Integrated variable speed fans • High and low frequency demand responsive controls 	<ul style="list-style-type: none"> • Hot Water: Heat Pump Water Heating (CO2 Natural Gas) • Space Heating and Cooling: Combined hydronic heating and cooling (Natural Gas condensing Air to Water Heat Pump) • Whole House Controls: Wireless addressable appliance, lighting and plug loads • Energy Storage: Thermal Electric • Integrated envelope: thicker wall sections deeper window flanges verified low infiltration • IAQ and Ventilation: reduced ventilation to dilute toxic off-gassing 	<ul style="list-style-type: none"> • Dedicated Outdoor Air System (DOAS): With heat recovery Generation 2: high efficiency HX, economizer, smart controls, self monitoring, addressable • Radiant ceiling heating and cooling: Flat panel grid suspended acoustic panels integrated architectural elements • Building Automation: Addressable controls of lights and plug loads Performance tracking • Energy Storage & Distribution: Thermal Electric Micro Grid • Integrated lighting: high quality source + control easy to use local controls w/good interfaces
Agricultural	Industrial	Public
<ul style="list-style-type: none"> • Irrigation system efficiency • DR pumping • Title 23 system-level measures: similar to model landscape ordinance 	<ul style="list-style-type: none"> • Lab hood sash controls and VAV • Compressed air systems: capacity controls leakage testing • Networked FDD steam traps 	<ul style="list-style-type: none"> • ZNE Issues Guide for State Buildings • TDV Valuation Tool for State Buildings • Integrated PV, storage and emergency generation

Figure 3. Top Measure Code Readiness Opportunities by Sector in 2016

Cross-cutting	Residential	Commercial
<ul style="list-style-type: none"> • ZNE Guidelines • Variable speed <ul style="list-style-type: none"> ○ space heating and cooling ○ air compressors ○ cooling and refrigeration ○ boilers • PV infrastructure with battery storage • Low GWP refrigerants • Water Use Efficiency • Outdoor lighting • Integrated Demand Flexibility • Steam Traps • Drain water heat recovery • Air to air heat recovery 	<ul style="list-style-type: none"> • Advanced envelope opportunities – windows, walls, attic • Heating and Cooling Delivery <ul style="list-style-type: none"> ○ radiant ○ ductless ○ ducts in conditioned space • Combined water and hydronic water and space heating • IAQ and Ventilation Cooling • Integrated Demand Flexibility and TOU Rates • Home automation with high energy efficiency networking equipment • PV with battery storage for peak demand reduction • Indoor lighting – LED & lighting quality • Outdoor lighting and motion controls • Variable speed swimming pool pumps and replacement motors • CO2 and Gas Heat Pump Water Heater • DHW – compact distribution and drain water heat recovery 	<ul style="list-style-type: none"> • Generation 2 DOAS with HR, FDD, EMS • Indoor lighting LPD and controls • IAQ and Cooling Ventilation • Heating and cooling only <ul style="list-style-type: none"> ○ radiant ○ chilled beam ○ VRF heat pumps • Optimize WWR, U-factor, SHGC • Parking lot lighting • Storage (electricity and thermal) to reduce peak demand • CO2 supermarket and commercial refrigeration • Warehouses – multiple measures • Drain Water heat recovery • 2023 efficiency level RTU with suite of system requirements
Agricultural	Industrial	Public
<ul style="list-style-type: none"> • Irrigation efficiency for emitter types and emitter selection • Irrigation Pump Systems optimized by site conditions, weather, and crop 	<ul style="list-style-type: none"> • Large horse power variable speed motor systems • Refrigeration evaporator fan speed control • FDD networked steam traps • Gas fueled hydronic <ul style="list-style-type: none"> ○ injection molding ○ high vacuum diffusion pumping 	<ul style="list-style-type: none"> • See sectors above

Within the Approach Section, C&S describes new and innovative strategies and tactics, some of which will lead to initial efforts at the program level. C&S will describe any unique and innovative aspects of each program, as well as any initial activities contemplated or underway, within program-level implementation plans.

G. Statewide Administration and Transition Timeline

TBD

H. Solicitation Strategies

TBD

I. Metrics and EM&V

C&S and the other cross cutting programs are focused on supporting statewide policy objectives, such as the doubling of energy efficiency by 2030 and efforts to work towards ZNE buildings. Each of the cross cutting programs supports statewide goals in its own way. C&S does this by advocating for stronger building codes and standards at the local, state, and federal levels, as well as supports the compliance of those more efficient codes and standards.

The specific goals of C&S are:

- Save energy (in particular X,XXX GWh across the state by 2025) and water, and reduce greenhouse gases through the adoption of new codes and standards at all levels (i.e., local reach codes, state, and federal)
 - This includes enabling and support state agencies responsible for achieving state policy goals by providing them with research
- Provide services that support and align with state policy objectives by:
 - Producing high-quality information and data to support CDIT, which aims to transition a measure or system (bundle of measures) into code during the early stages of the diffusion cycle⁴⁵
 - Maintaining high compliance margins for whole buildings and appliances; and improving compliance margins for selected, high importance codes and standards
 - Increasing adoption of local reach codes that support the development and adoption of statewide and national code changes

In addition to savings, the primary metric C&S and the other cross-cutting programs at the business plan level is alignment with state policy goals and the portfolio. 'Alignment,' however, is difficult to measure given the changing needs of the state. As such, C&S proposes that on an annual [or bi-annual] basis it will present the long-term integrated plan for C&S. Following the long-term integrated plan, we will also present an annual measurement of accomplishments against the goals set forth in each of the annual C&S plans. Thus, similar to the other cross-cutting areas, C&S proposes an annual planning and reporting process as the metric of success.

The C&S plan will include the timeline set forth by California policy to reach milestones on the pathway to ZNE. The Energy Commission makes the final decision as to what criteria constitutes success, and it is C&S' goal to offer in-depth support to Energy Commission staff and Commissioners in this process.

C&S activities will also be measured by the success in improving compliance and supporting the creation of electronic infrastructure systems, such as databases and repositories that collect information that provides evidence of improved uptake of adopted standards. All of these program level objectives (and related measures of success) will be described in the plan.

⁴⁵ CDIT is a feature of the "code readiness" strategy, and applicable to PG&E only.

Table 6. C&S Metrics

Goals	Intervention Strategies	Metric	Baseline (or Benchmark)	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Target (8-10+ years)
Save XX GWh, XX MW, xx MM therms and XX GHG from C&S efforts (supported by ETP)	All C&S Interventions	Electricity	Average of XX GWh/ year across 2011-2015	Impact studies	XX GWh	XX GWh	XX GWh
		Demand	Average of XX MW / year across 2011-2015		XX MW	XX MW	XX MW
		MM Therms	Average of XX MM Therms/year across 2011-2015		XX MM Therms	XX MM Therms	XX MM Therms
		GHG reduction	XX tons GHG		XX tons GHG	XX tons GHG	XX tons GHG
Support State Policy and Portfolio Goals	Integrated Planning in C&S, ETP and WE&T All cross-cutting interventions	Alignment and support for State Policy Goals measured by accomplishments against plans	Initial report will be done in early 2017 (on 2016 programs)	Annual reporting by PA	Track alignment; Demonstrate leadership in coordination with stakeholders		

J. EM&V Preparedness and Research Needs

C&S has identified several overarching data gaps in C&S. The research for this sector will be contingent on the needs of the portfolio as a whole and the annual research budget for this sector. However, C&S believes that the following studies should be considered in the EM&V Research Plan.

Studies to support C&S:

- Program attribution study (forthcoming): Program attribution has been difficult to determine. Studying the potential indicators for program attribution will provide greater clarity on attributing program savings to the IOUs.
- Code compliance study: Anecdotal evidence on code compliance is often discussed but actual measurements of code compliance are minimal, especially with HVAC measures and NR lighting retrofits. Studying code compliance on HVAC measures and NR lighting will provide information on areas for the program to improve code proposals in these two key areas.
- Periodic market studies to determine market effects: Potential study provides a market baseline for specific building systems that will be targeted by the program. Tracking the uptake of efficient systems requires additional data collection and analysis. The baseline study should be updated twice, once by the end of year five and the other by the end of year nine.

As described below, 2015 planned IOU-led studies include those to 1) determine code readiness, 2) explore methods for Title 24 improvement, and 3) conduct a process evaluation of IOU C&S Program trainings, classes, and tools.

a. EM&V within C&S

EM&V activities supporting the C&S Program serve three distinct needs:

1. All of the baseline data collection efforts described next employ C&S, rather than EM&V, dollars since they are integral to program implementation. They are considered part of the program implementation process, rather than the formal EM&V process. Detailed baseline data collection forms the basis for support of federal and State standards development. Standards development, at both the state and federal levels, is grounded in a firm understanding of existing conditions of energy use by appliance, system, and market segment. Without current, appliance/equipment usage information by market segment credible estimates of standard's savings, lifecycle cost, and prospective cost effectiveness it is impossible to present a persuasive case for adoption of a proposed standard. Large, statistically valid samples of customer-specific appliance holdings, building conditions, and consumption patterns are obligatory for establishing the appropriate scope and level of a proposed standard. These efforts demand carefully designed sampling plans, extensive on-site survey efforts, and energy use metering at both the appliance/system and whole building levels. Optimally the sample designs must be sufficiently robust to allow testing of potential efficiency changes to support the standard development process.

The detailed baseline data collection efforts are also critical in the examination and characterization of compliance issues that have arisen with current standards. This is essential so as to not create similar compliance issues as standards are ratcheted upward.

2. Development and tracking of program implementation metrics to gauge sub-program effectiveness is essential to continued improvement of program implementation efforts. Advocacy efforts are the key driver of readily measurable energy savings for the C&S Program. Rigorous recording and detailing of IOU advocacy efforts is essential in order to determine the relative impact of IOU efforts on passage of

new codes and standards. Such information, gathered as part of program implementation efforts, is used in the preparation of Code Change Theory Reports (CCTRs) that form the basis for program attribution determination by CPUC impact consultants.

The use of program implementation metrics is also important in determining the effectiveness of C&S efforts for which direct energy savings information is not readily available. Compliance Improvement efforts, for example, are not easily measured by changes in program savings due to the cost of obtaining detailed compliance data. In particular, building standards compliance data is notoriously costly to obtain. Hence, program efforts are measured by a variety of non-savings implementation metrics that track the effectiveness of compliance improvement/education efforts.

Non-resource implementation metrics are also necessary to track the reach code support efforts that comprise the IOUs' Reach Code subprogram. While reach codes do generate direct savings the IOU efforts are aimed at providing tools for local jurisdictions to implement reach codes. It is up to the jurisdictions to use the tools as part of their enforcement efforts.

Non-resource program implementation metrics will also be needed to track code readiness subprogram efforts. The intent of code readiness efforts is to accelerate the market transformation effects of C&S efforts, rather than directly generating large amounts of near-term savings. Consequently, a set of new program implementation metrics will need to be developed to track code readiness efforts and effectiveness.

3. Preparation of materials to aid Commission staff evaluation of CDIT efforts⁴⁶

- a. CCTRs aide net impact determination by Commission staff consultants and establish program activity and code change attribution documentation. CCTRs provide verification of code change logic models and provide insight into the effectiveness of various code advocacy efforts. They play a historical and on-going role in determining savings attributable to IOU program efforts.
- b. Potential study support to help the Commission appropriately allocate future EE budgets
 - i) C&S studies, as funded from EM&V and documented in the EM&V Plan (now Version 6), support program development and provide insight into future opportunities for successful code advocacy.
 - ii) Notable 2010 – 2012 IOU-led studies included 1) a Statewide C&S Program Process Evaluation, which investigated implementation and documentation of Title 20 and 24 advocacy and CASE studies, 2) an Incremental Measure Cost analysis to examine the decline of Title 20 Appliance products costs and update forecasting methods, and 3) a policy thought paper to determine the baselines for building alterations.
 - iii) Notable 2013 – 2014 IOU-led studies have included 1) an assessment of savings overlaps from interactive effects currently unaccounted for in CASE studies, and 2) analyses of 2008 Title 24 nonresidential compliance audits.
 - iv) Planned 2015 IOU-led studies include studies to 1) determine code readiness⁴⁷, 2) explore methods for Title 24 improvement, and 3) conduct a process evaluation of IOU C&S Program trainings, classes, and tools.

⁴⁶ CDIT is PG&E-specific

⁴⁷ Code readiness is PG&E-specific

K. Reference List

TBD: PAs will complete this section in the final C&S business plan chapter.

L. Appendices

Appendix A. Stakeholder Feedback

All Issues Identifier Number (Index)	Relevant Committee or Subcommittee	Topic	Source/Issue ⁴⁸	Page Number
0084	X-Cut: C&S	Business Plan Topic	Comment that Program Administrators talk about the challenge presented by Codes & Standards. Suggestion that those in charge of running C&S programs should talk about the how they affect implementation and how they can address those challenges.	TBD

⁴⁸ As indicated in the Issue Tracking Spreadsheet on the CAEECC website, please note that not all issues depicted here are factually correct or current. Additionally, some are paraphrased and others are more verbatim depending on how issue came into tracking process.

Appendix B. C&S Business Plan Checklist

	Cross Cutting Sector	
BP Page Number	Business Plan Guidance	Notes
NA	A. Market Characterization	Per Commission staff suggestion, PG&E has renamed this section "Sector Overview"
8, 38	a. Customer landscape (who they are, what are their needs)	
8-10	b. Trends	
10-13	c. Gaps/Barriers	
33-37	B. Value	In drafting the BP cross cutting chapter, PAs determined this information would fit best woven throughout the chapter. PG&E has moved this specific section to the appendix
33	a. Discussion of roles for cross-cutting sector	
34-35	b. How does it support portfolio	
35-36	c. How does it benefit customers	
36-37	d. External impacts and benefits (community/economic benefits)	
1	C. Vision	
1-2, 14-25	a. Discussion of opportunities	
14-25	b. Whether items are near-, mid-, long-term strategic initiatives	
26-27	D. Metrics	
27	a. One metric or more as appropriate for each intervention strategy	
14-25	E. Program/PA Coordination: Description of which and how strategies are coordinated regionally among PAs and/or other demand- side options.	TBD - PAs will complete this section in the next draft iterations
28-29	F. EM&V Considerations: Statement of evaluation needs "preparedness" (i.e., data collection strategies and internal performance analysis)	

Appendix C.: Codes and Standards Value

Roles for Codes & Standards Program within the Cross-Cutting Sector

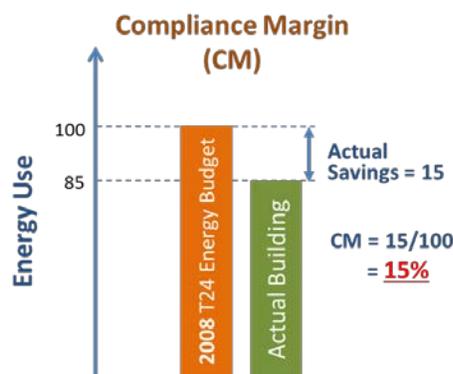
The C&S Program emerged during the late 1990s when California's first attempted to transition away from resource acquisition to market transformation programs. The program objective was to cause permanent reductions in energy use through improvements to Title 24 building codes and Title 20 appliance standards. Circa 2005, advocacy was extended to include federal appliance standards, which are embodied in Title 20 after a DOE final rule.

For measures included in incentive programs, codification of a measure provides an exit strategy to sunset incentive support for technologies that have graduated from emerging to standard practice, completing transformation and liberating funds to be used for new technologies. To ensure the savings from newly adopted codes and standards are realized, the compliance improvement team conducts education and training, and develops tools, to help individuals within compliance supply chain (builders, contractors, manufacturers, etc.) correctly implement state and federal regulations.

Figure 4 shows, based on CPUC evaluations, that compliance margins (percent beyond code) for whole buildings and lighting alterations exceed code baselines, indicating robust compliance with building codes from an energy use perspective.

Figure 4. Compliance Margins from CPUC Evaluations⁴⁹

	Standards	Compliance Adj. Factor (CAF)	Compliance Margin (% above code)
2006 – 08 Evaluation	2005 T24 RNC (whole Building)	120% (Electric) 235% (Gas)	Not available
	2005 T24 NRNC	61.5% (8 – 100%)	
2010 – 12 Evaluation	2008 T24 NRNC	410% (kWh) 328% (kW) 118% (Therm)	13% (kWh) 14% (kW) 1% (Therm)
	2008 T24 NR Alteration	304% (Indoor lighting, kWh) 83% (Re-roof)	7% (Indoor lighting, kWh) Unknown for re-roof*



Through reach codes, and planning and coordination activities, the program conducts activities to advance and harmonize codes, standards, and ratings by local governments, ASHRAE and others, such that they support California building codes and appliance standards and other goals. Internal coordination serves to inform programs regarding upcoming changes and gather information to support future code enhancement proposals.

How does it support the portfolio

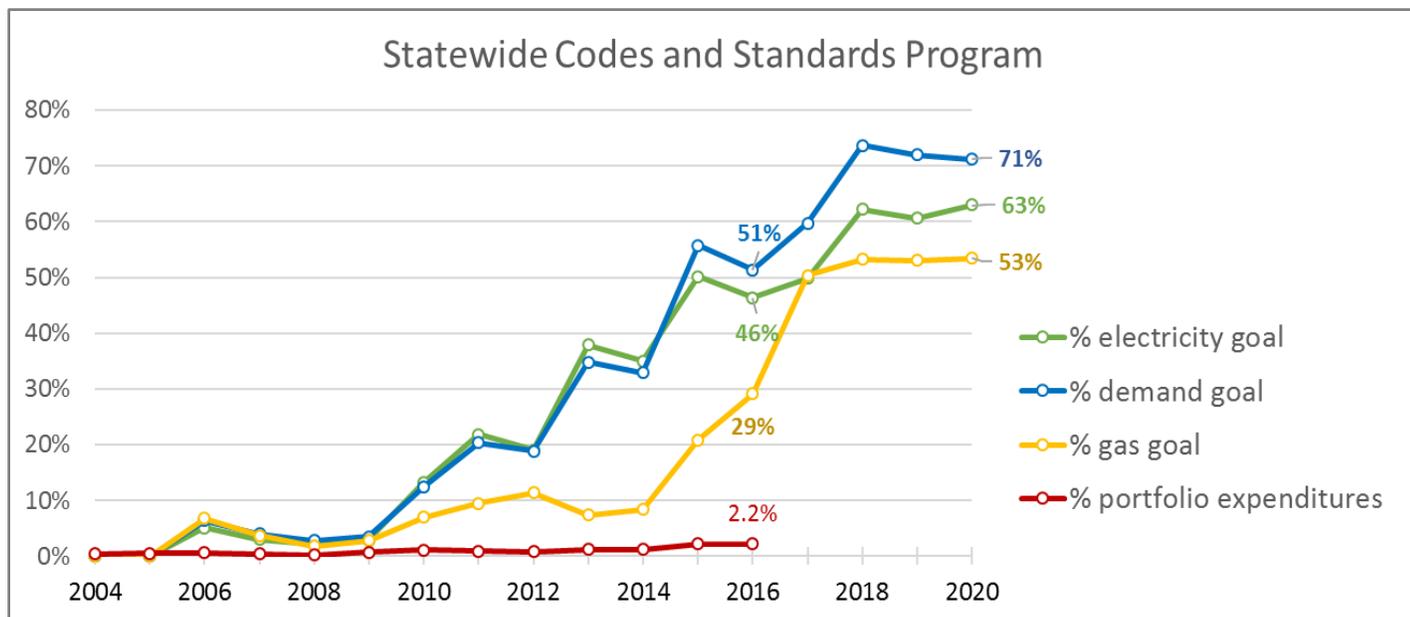
The C&S Program is an extremely cost-effective program since savings continue to accrue for many years following the C&S Program advocacy activities. In 2016, with a statewide budget equal to approximately 2.2 percent of the portfolio total, the C&S Program will generate approximately half of the portfolio electric savings (46 percent electricity, 51 percent demand) and almost one-third (29 percent) of gas savings.

Given delays between research and rulemakings, and between adoption and effective dates, several years may lapse between advocacy efforts realized savings. The savings shown in Figure 8, below, show that measures adopted because of C&S Program efforts conducted through March 2016 will continue to produce savings equal to more than half of the total portfolio savings through 2020. The activities described in this

⁴⁹ CPUC 2010 (Cadmus). "CA IOU C&S Program Evaluation for Program Years 2006-08." CPUC 2014 (Cadmus). "Statewide C&S Program Impact Evaluation Report PY 2010-12."

business plan will produce savings from appliance and building standards scheduled for adoption before 2020, and will set the stage for a stream of savings to be realized in future code cycles.

Figure 5: Codes and Standards Program Budget and Savings



Note: the estimated demand, electricity, and gas percentages are calculated by dividing the C&S savings by the total portfolio savings (C&S and incentive programs). The C&S Program savings are based on adopted standards (thru March 2016) for which Statewide IOU team conducted advocacy efforts. The C&S savings are derived from either CPUC Impact Evaluations (for standards that became effective in 2006 thru 2012) or IOU estimates (for standards that become effective in 2013 and beyond). The incentive program savings are estimated based on CPUC evaluation results (for savings from 2004 to 2012), IOU estimates (for savings from 2013-15), and incentive programs goals provided in the CPUC Decision 15-10-028 (2016 and beyond). Per prior CPUC policy, C&S Program savings are *net* and incentive programs savings are *gross*. [Note: The August 2016 CPUC decision D.16-08-019 has now recommended that incentive program goals be measured in *net* goals rather than *gross* goals to address potential free ridership concerns.]

Just as the C&S Program serves a diverse customer landscape, it also plays a cross-cutting role in supporting the other programs and departments within the Energy Efficiency group at each IOU. Accurate data derived from data gathering from code-driven research and market analysis to support the development of effective standards may also be a resource for program developers and implementers serving customers that the standard will eventually impact. This positions the C&S Program to share knowledge through existing relationships.

Benefits to customers

C&S activities benefits California’s customers by:

- 1) Significantly reducing in energy bills for all customers;⁵⁰

⁵⁰ For example, annual bill reductions per home resulting from the Statewide C&S program advocacy is estimated at \$400/y for newly constructed homes and \$100/y for existing homes. See slide 4 of the May 4, 2016 Stage 2 Statewide C&S presentation for the EE Coordinating Council.

http://media.wix.com/ugd/0c9650_7b6b1a4581114c73b658ca50b37ba625.pdf

- 2) Providing a solution for the “split incentive” problem faced by a larger percentage of customers who are tenants. (Many landlords purchase appliances based upon first cost, so the improved standards provide the best chance for improved energy efficiency for tenants.); and
- 3) Supporting building design teams, contractors, customers and government agencies to improve their ability to comply with codes and standards.

C&S activities benefits state agencies by:

- 1) Achieving progress toward CPUC, Energy Commission, and CARB policy goals;
- 2) Coordinating with other entities to support the state’s ambitious energy policy goals; and
- 3) Assisting local governments in developing ordinances that exceed statewide minimum requirements.

External Community and Economic Impacts and Benefits

Codes and standards have far-reaching impacts, throughout California and beyond. California frequently leads the nation in setting stringent codes and standards, and many of the benefits realized in California spillover to other states nationwide, and also internationally.

When a code or standard is adopted, it begins permanently changing the market, and the covered technology (or equipment or activity) typically becomes standard practice. Impacts from these market changes provide significant benefits to both IOU and non-IOU customers throughout the state. This benefit affects those who participate in IOU incentive programs as well as those who do not. The Energy Commission estimates that savings from implementation of the 2016 building standards will reduce annual statewide greenhouse gas emissions by 160,000 metric tons of CO₂e⁵¹.

In addition, the economic benefits continue to accrue with each transaction following a code adoption translating to reduced operating costs which directly impact the bottom line for everyone, including:

- Local governments: increase ability to meet local goals through supporting standards implementation;
- Local businesses: increase profits, reduce prices; and
- Homeowners and residents: lower energy costs, increase in discretionary income.

An increase in discretionary income produces increased spending, at least some of which will be spent at locally-owned businesses, compounding the benefits further through the local multiplier effect, which posits that money spent within the community produces a greater local economic benefit as it recirculates and is re-invested in the community.

Updated codes often spur market innovation to increase customer functionality and energy efficiency. One good example of this is residential clothes washers. In 2006 DOE implemented a clothes washer standard that improved the efficiency to push most top loader washers out of the market. This was a pretty progressive move towards energy efficiency at a time when top loading washers still dominated the market. Front loaders were a premium product in the US even if they dominated the market in Europe. As a result of DOE’s regulation manufacturers now produce a low cost front loading washing machine that saves water and energy (while still effectively cleaning clothes). This type of code-driven innovation has encouraged manufacturers to engineer better products while saving energy.

⁵¹ 2016 Building Energy Efficiency Standards, June 2015. http://www.energy.ca.gov/2015publications/ENERGY_COMMISSION-400-2015-037/ENERGY_COMMISSION-400-2015-037-CMF.pdf

The C&S Program creates jobs through direct employment, indirect employment, and induced employment. The program creates jobs in all three categories with a significant amount created from induced employment which accounts for the expenditure-induced effects in the general economy due to the economic activity and spending of direct and indirect employees. These shared benefits are reinvested in local economies by millions of customers. Wei et al. (2010) estimates that energy efficiency creates 0.17 to 0.59 net job-years per GWH saved.⁵² By comparison, they estimate that the coal and natural gas industries create 0.11 net job-years per GWH produced. When utilizing a mid-point for the energy efficiency range (0.38 net job-years per GWH saved), and assuming 80,000 GWH in committed statewide efficiency savings from codes and standards by 2026, the resulting cumulative job creation would be a projected 30,400 jobs.

⁵² “Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?” Max Wei, Shana Patadia, and Daniel M. Kammen. *Energy Policy* 38 (2010) 919–931.

Appendix D. Customer Landscape

C&S affect many stakeholders in the building industry supply chain. Appliance standards impact all customers who purchase regulated products. Considering this, the influence of C&S has an effect on virtually all customers. With respect to advocacy engagement, priority stakeholders include those who can affect the success of standards in the rulemaking process and through implementation. Stakeholders include, but are not limited to:

- a. Local, state and federal government agencies
 - i. Local jurisdictions
 - ii. State agencies
 - iii. Federal agencies
- b. Utility colleagues
 - i. California investor-owned utility (IOU) partner utilities
 - ii. Non-California based IOUs operating in California
 - iii. California-based municipal utilities
 - iv. National utility partners
 - v. Third party implementers
 - vi. Trade professionals
- c. Standards, testing, and ratings organizations
 - i. Professional organizations (ASHRAE, IES etc.)
 - ii. Industry organizations (AHRI, NEMA, AGA, CTI etc.)
 - iii. Voluntary equipment rating programs (ENERGYSTAR, DesignLights Consortium, CEE, WaterSense etc.)
 - iv. Building rating programs (LEED, PassiveHouse, EPA PortfolioManager, Living Building Rating etc.)
 - v. Building testing organizations (HERS, NatHERS, ATTs, Commissioning Organizations)
 - vi. Governmental organizations (DOE, NIST, National Labs, EPA)
- d. Enforcement agencies
 - i. Building inspectors
 - ii. Plans examiners
 - iii. Building official advocacy groups (CALBO)
- e. Regional partnerships & advocacy groups
- f. Construction industry market actors
 - i. Design professionals, contractors, engineering firms, energy consultants, HERS raters, and acceptance test technicians
- g. Construction industry suppliers
 - i. Manufacturers, distributors, and retailers
 - ii. Industry associations
- h. Building owners and operators
 - i. Building owners (BOMA, California Business Properties Association, etc.)
 - ii. Occupants (employee unions, retailers etc.)
- i. Demand response providers
 - i. California utilities
 - ii. Third party implementers
 - iii. DR Equipment providers
- j. Renewable energy providers
 - i. Solar equipment manufacturers
 - ii. Solar installation companies

Renewable energy advocacy groups (CalSEIA, Environmental Groups)

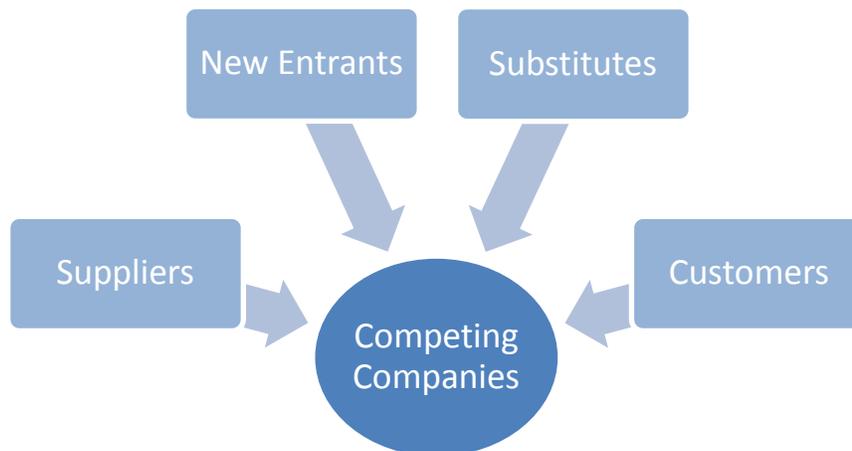
Energy Commission

Appendix E. Overview of PG&E’s Code-Directed Industry Transformation (CDIT)

PG&E plans to implement strategies and tactics to advance CDIT.⁵³ A market may be defined as a group of potential customers or buyers within a geographic boundary. From this perspective the market for an upstream or midstream incentive program may be customers within California’s political boundaries and be dominated by individuals who purchase from distributors or retailers. The market for a downstream program may be an IOU service territory and be dominated by builders and contractors. Customers (contractors, individuals, etc.) within a geographic boundary choose from a selection of substitute products depending on price and amenity.

One of the problems with implementing “market transformation” through incentive and other programs is that many customers within a market do not respond to incentive programs due to various market barriers. “Markets” are somewhat amorphous in that they comprise dissimilar customer groups for different products, and incentive programs may not be designed to distinguish between various customer groups. Moreover, markets are only one piece of a larger strategic picture, and most individuals have little or no input to industries that provide EE products or services. For these and other reasons, voluntary programs cannot generally achieve market transformation alone, which is why markets are regulated through legislation, codes and standards and executive orders.⁵⁴

Industries are comprised of companies (builders, retailers, etc.) which compete with one another based on price, differentiation, or other means. For example, an industry may be defined by firms that compete to build new grocery stores. Another industry may include companies that manufacture specific types of residential lighting products. As part of competitive strategy, these companies will consider the strengths and weaknesses of competitors, potential new entrants, substitute products, the relative strengths of suppliers and customers, and other issues.



Based on work by Michael Porter, Harvard University

⁵³ CDIT is a PG&E-specific activity

⁵⁴ Within this context, we recommend that policy makers consider the usefulness of Market Transformation as a framework for individual incentive program design.

When applying industry analysis to the business of energy efficiency, a number of the questions emerge:

- How intense is competition between builders, of low-rise office buildings for example?
- If competition is fierce, can we leverage this competition to reduce the number of projects?
- Do suppliers have an advantage relative to builders?

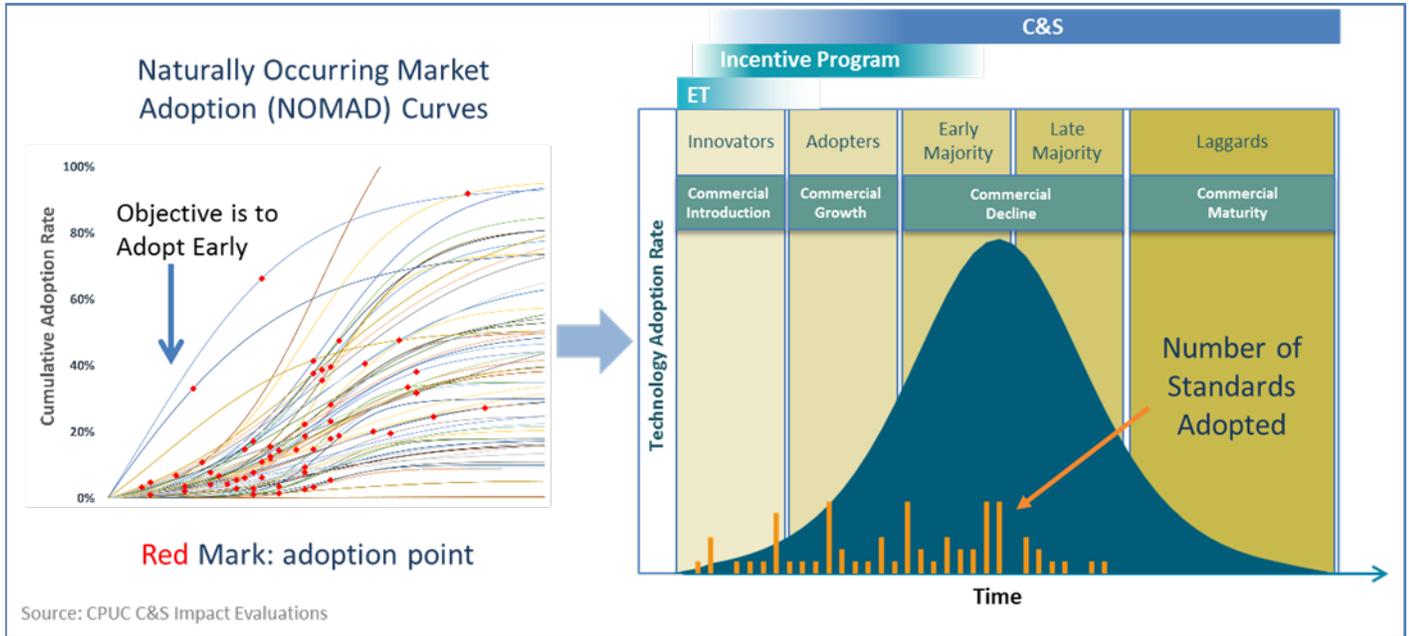
For example, do suppliers of disruptive HVAC systems have a negotiating advantage with respect to builders and, if so, what competitive strategy is driving the supplier? Do buyers/customers have an advantage relative to builders? How many builders compete to build warehouses? Can a small group of relocatable classroom manufacturers be transformed with codes and standards? Are there new builders or suppliers entering a specific industry? If so, are they entering the industry based on cost or differentiation? Partially successful, voluntary, market transformation efforts are likely based on informal industry analyses by experienced individuals who understand an entire industry.

If done thoughtfully, industry analysis can leverage competition to change a group of companies and transform an industry. Industry analysis is a common tool for decision making that can support a new approach to C&S work, Industry Transformation. PG&E will employ analysis to target code readiness projects and research. PG&E anticipates that industry analysis will set us up for better transitions to incentive programs, and eventual Industry Transformation.

CDIT includes intentional and specific activities executed to realize the outcomes expressed in CPUC Decision (D.)09-09-047, which defined market transformation as “long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies until they are adopted into codes and standards (or otherwise adopted by the market), while also moving forward to bring the next generation of even more efficient technologies to the market.”

The objective of applying CDIT is accelerate the adoption of new technologies earlier in the product life cycle. Achieving this goal will save significantly more energy for less money compared to business as usual. As can be seen on the left side of Figure 6, there is little or no correlation between cumulative market adoption rates and the market share at which measures are adopted into code. This occurs because code readiness is determined not by market share, but by life cycle cost effectiveness and technical feasibility as defined by the Warren Alquist Act. CDIT will therefore conduct activities that advance determinants of code readiness; in particular, designer, builder and contractor feasibility studies and documentation of the cost effectiveness of measures over time. The assessment for code readiness and evaluation of technologies as they would function within the larger building system must begin as soon as the technology is market-ready and shows potential.

Figure 6: Market Adoption Rates



CDIT begins by breaking broad policy goals into actionable objectives. After selecting a specific objective, planning and coordination develops and manages a long-term tactical plan to achieve specific building code objective, and conducts a parallel assessment of appliances needed to optimize the building codes. Since the energy use from unregulated (by T24) appliances represents approximately 50 percent of electricity energy use in residential buildings,⁵⁵ and approximately 30 percent in nonresidential buildings,⁵⁶ the parallel effort to improve the efficiency of appliances is as important as building efficiency.

Given the magnitude of energy use for unregulated appliances relative to the whole building, work will be conducted to optimize the performance of appliances and document performance, and be supported by field studies to produce population data. Additionally, the code readiness activities may be conducted to leverage C&S Program research to support development of new measures for programs.

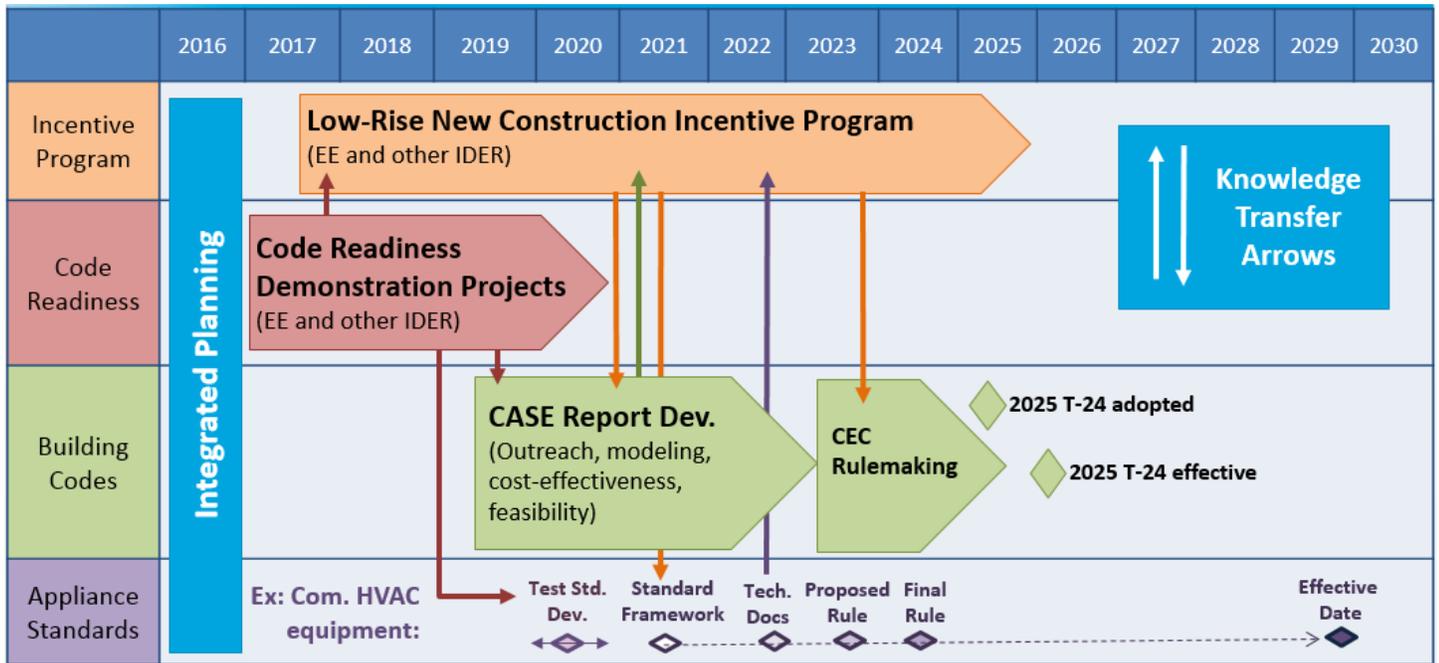
A key part of CDIT is that specific measures and systems will be transferred from code readiness projects into other programs; for example, performance based programs be repurposed to promote specific measures identified through code readiness work (“Incentive Program” lane in Figure 7). This level of specificity (see vertical blue box in Figure 7) between other programs and C&S staff will increase the likelihood of knowledge transfer and will enable continued documentation of feasibility and costs data for specific measures needed to support future code enhancement proposals, and C&S will partner with programs with commercial and residential programs collect these data. Also, PG&E’s collective effort will aim for a small number of projects

⁵⁵ 2009 California Residential Appliance Saturation Study (RASS) Executive Summary Prepared for: California Energy Commission Prepared by: KEMA, Inc. OCTOBER 2010. Report No. ENERGY COMMISSION - 200 - 2010 - 004 - ES. http://www.energy.ca.gov/2010publications/ENERGY_COMMISSION-200-2010-004/ENERGY_COMMISSION-200-2010-004-ES.PDF

⁵⁶ California Commercial End-Use Survey Prepared For: California Energy Commission Prepared By: Itron, Inc. March 2006 CEC-400-2006-005. <http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF>

with each of several actors selected within target industries,⁵⁷ including industry focused training, to rapidly expand feasibility. These high-touch, industry-focused efforts may be conducted within the C&S program or in partnership with other local residential and commercial code readiness programs.

Figure 7: Integrated Planning to Achieve Code-Directed Industry Transformation (Low-Rise Commercial New Construction Example)



Serving as an example of a CDIT strategy in action, in 2016 the DOE adopted the first dedicated purpose pool pump standard in the nation. As pumps are replaced or new ones are purchased, the standard is expected to reduce filtration pumping energy use by 75 percent and demand by 85 percent. The standard will deliver a national reduction in individual pool filtration energy consumption from 2,600 kWh per year to less than 800 kWh per year. This new standard is the result of long-term interventions by utilities using voluntary incentives, industry collaboration, trade education, and advocacy. The standard is a documented, positive outcome of cross-cutting collaboration that includes incentives coupled with education and outreach, which led to manufacturer product development, increased program participation and market share, and finally new standards at both the State and federal level.⁵⁸

⁵⁷ This is in contrast to incentive programs which are indifferent to the breadth of coverage among actors within a specific industry.

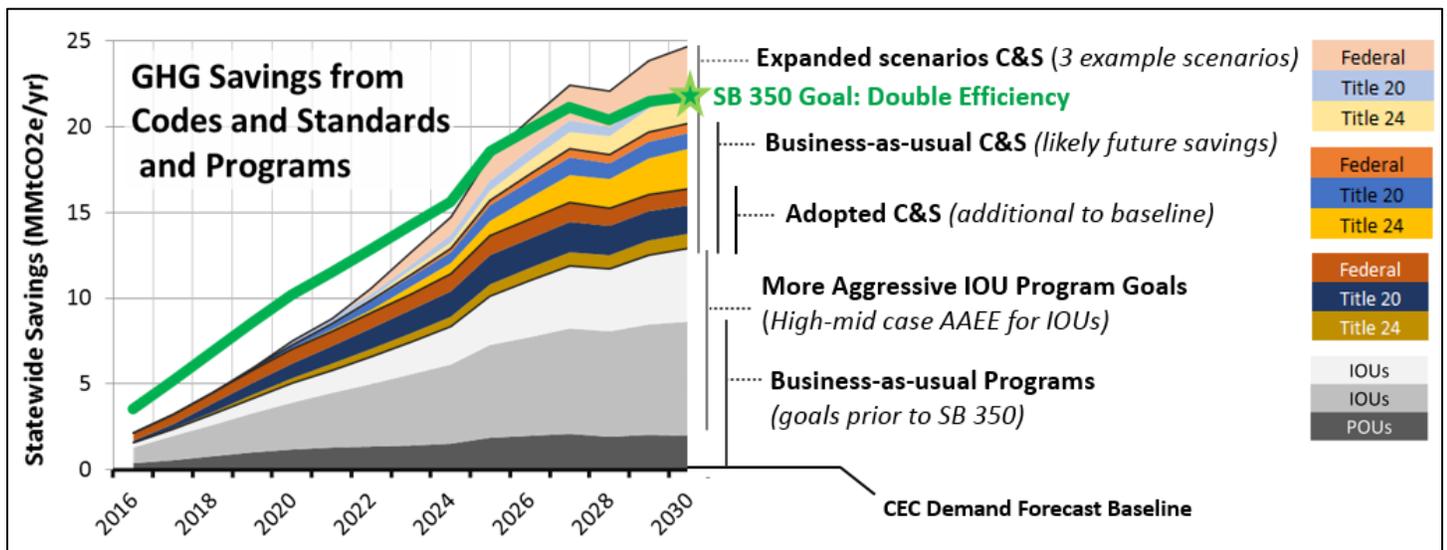
⁵⁸ Gary Fernstrom, Alina Zohrabian, Lianne Westberg, Chad Worth, "Standards Driven Market Transformation; 20 Year Multifaceted Intervention Leads to DOE Pool Pump Standard," 2016, ACEEE Summer Study.

Appendix F. C&S Opportunities

California has difficult tasks ahead between now and 2050. The first is to achieve existing policy goals, including ZNE for new buildings and to double energy efficiency results by 2030 (see Figure 1). Then, we will need to “widen” existing policy wedges based on successful implementation and establish new policies to fill the gap between business as usual and policy goals (in red below, Figure 2).

C&S calculates that business-as-usual savings from programs will achieve roughly 40% of the 2030 SB 350 goal. If IOU programs were expanded from business-as-usual to the savings levels estimated in the high-mid case of Additional Achievable Energy Efficiency (AAEE) specified in Navigant’s Potential and Goals Study,⁵⁹ programs could achieve 59% of the 2030 SB 350 goal. The additional savings from C&S that have already been adopted but which were not included in the baseline for the SB 350 goal (“Adopted C&S”) will increase total savings to 58% of the 2030 milestone. Adding savings from likely future C&S (measures that have not yet been adopted) results in the total savings from “business-as-usual” Programs and C&S: 93% of the 2030 goal. Given three potential assertive expansions to business-as-usual C&S⁶⁰, we estimate that California could double efficiency by 2030, reaching 113% of the 2030 goal. Figure 1 summarizes the high-level results of savings potential analysis from 2016-2030, in the context of estimated GHG reductions from achieving the SB 350 doubling efficiency goal.

Figure 8. Deeper Codes and Standards Energy Savings to Double Efficiency by 2030



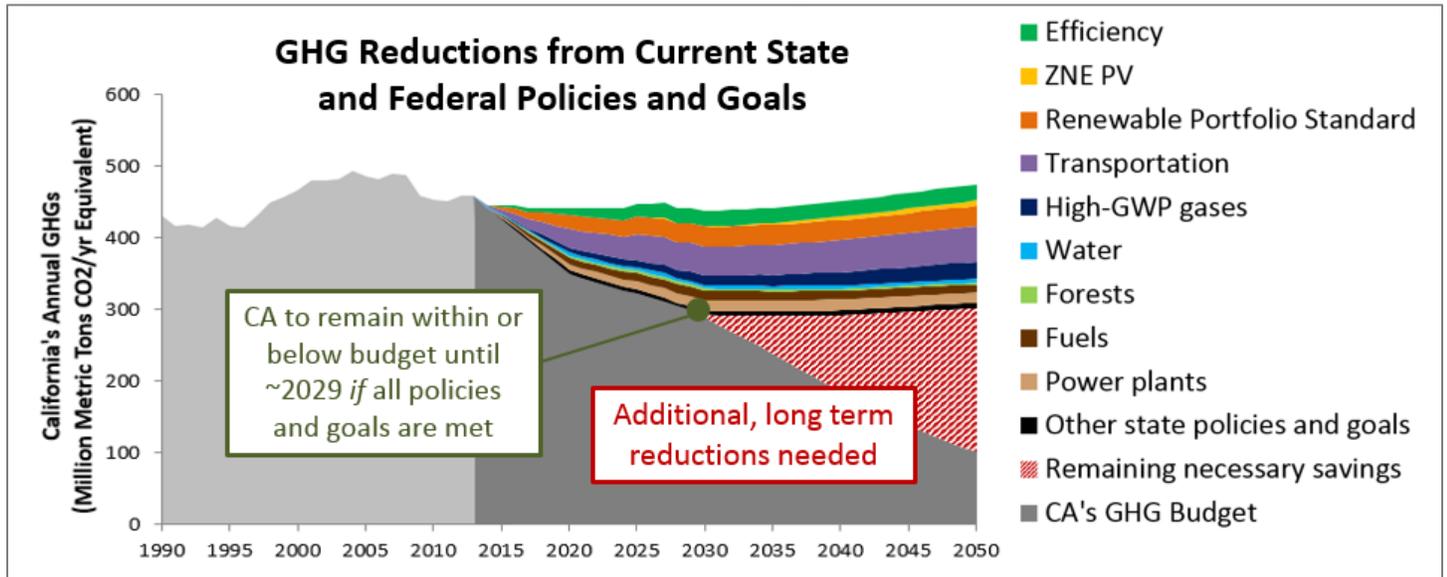
General sources and assumptions: C&S savings are discounted by subtracting estimates of non-compliance, (NOMAD), and overlap with Program savings. SB 350 doubling efficiency goal - analysis conducted by NRDC, which followed the methodology prescribed in the senate bill language. Annual emissions factors – E3’s PATHWAYS model, “Straight Line” scenario. See Eilert et al. *Codes and Standards Climate Strategy* (2016 ACEEE Summer Study) for additional details.

⁵⁹ CPUC 2015 (Navigant). “Energy Efficiency Potential and Goals Study for 2015 and Beyond”.

⁶⁰ At a high level: 1. **Federal:** Enhanced savings for federally covered product categories (through DOE activity or preemption strategies); 2. **Title 20:** Double the rate of Title 20 measure adoption; and 3. **Title 24:** More aggressive efficiency levels and more retrofits affected. For further discussion, see “Codes and Standards Climate Strategy.” Pat Eilert, Eric Rubin, Alex Chase, and Yanda Zhang. 2016 ACEEE Summer Study. Note that the figure has been slightly updated since the ACEEE Summer Study paper was finalized.

The challenges will continue beyond 2030. Figure 2 below shows California’s historical GHG emissions and forthcoming goals established by AB 32, SB 32, E.O. B-30-15, and E.O. S-3-05 (the top of the gray areas represent GHG goals). If California’s policy goals are achieved, the State’s emissions are expected to decrease at a level that is consistent with GHG reduction goals until about 2029, but additional efforts are needed to reach longer-term goals. C&S can play a role in readying the state for these long-term challenges.

Figure 9. GHG Reductions from State and Federal Policies and Targets



Solid colored wedges indicate GHG reductions if current policy goals are met. Even if current policies are successfully executed, we will need additional strategies to achieve the 2030 goal (40 percent below 1990 levels, established by Executive Order B-30-15) and the 2050 goal (80 percent below 1990 levels, established by Executive Order S-3-05). Source: Eilert et al. Codes and Standards Climate Strategy. 2016 ACEEE Summer Study on Energy Efficiency in Buildings.

Appendix G. Abbreviations and Acronyms

ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ACEEE	American Council for an Energy-Efficient Economy
CALBO	California Association of Building Officials
CARB	California Air Resource Board
CBSC	California Building Standards Commission
CCTR	Code Change Theory Report
CDMT	Code-directed Market Transformation
Energy Commission	California Energy Commission
CPUC	California Public Utilities Commission
DER	Distributed Energy Resources
DOE	United States Department of Energy
DR	Demand Response
ED	Energy Division
EE	Energy Efficiency
EM&V	Evaluation Measurement & Verification
EPAct 2005	Energy Policy Act of 2005
EPCA	Energy Policy and Conservation Act
EPIC	Electric Program Investment Charge
ET	Emerging Technologies
GHG	Greenhouse gases
Green MLS	Green Multiple Listing Service
GWP	Global warming potential
HFC	Hydrofluorocarbons
ICC	International Code Council
IDER	Integrated Distributed Energy Resources
IOU	Investor Owned Utility
NEEA	Northwest Energy Efficiency Alliance
NEEP	Northeast Energy Efficiency Partnerships
NOMAD	Naturally Occurring Market Transformation
NRDC	National Resources Defense Council
PA	Program Administrator
RASS	Residential Appliance Saturation Study

RCx	Retro-commissioning
RPS	Renewable Portfolio Standard
REN	Regional Energy Network
SB	Senate Bill
T&D	Transportation & Distribution
TDV	Time Dependent Value
TRC	Total Resource Cost Test
US DOE	United States Department of Energy – US may not be used
US EPA	United States Environmental Protection Agency – US may not be used
US FTC	United States Federal Trade Commission – US may not be used
ZNE	Zero Net Energy
ZEV	Zero Emission Vehicles

Note: SoCalGas is submitting SCE's SW business plan chapter to fulfill the Emerging Technologies Cross-Cutting Chapter for this draft submission.

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1 Introduction

1.1 ETP overview

California's ambitious energy efficiency and greenhouse gas reduction goals (SB 350) require an acceleration of the product development, assessment, and deployment lifecycle for demand-side management (DSM) technologies so that program implementers may offer customers the high efficiency equipment they need to reduce energy use.

However, the need for rapid innovation is paired with the need for low-risk, reliable, cost-effective technologies whose energy savings can be realized and scaled for the vast and varied California marketplace.

The Emerging Technologies Program (ETP¹) is a non-resource program that supports the California ratepayer-funded programs² in this challenge by fulfilling six objectives:

- 1) identifying technologies with verifiable energy savings that may be considered by program administrators (PAs) for incentive programs,
- 2) filtering out technologies that are not appropriate for the California market, so that ratepayer-funded programs do not waste resources in developing measures³ that cannot deliver reliable energy savings,
- 3) supporting and working with technology developers to help inform future product development, so that they may ultimately build a mature supply chain for new measures,
- 4) coordinating information exchanges across internal organizations, PAs, and other technology assessment organizations, and
- 5) helping program managers reduce risk by testing new solutions on a limited scale in the market.
- 6) supporting market transformation (MT) by testing and supporting program deployment of measures destined for codes and standards over the mid- to long-term

ETP's primary stakeholder and target audience is the program administrator, not the consumer or technology end user⁴.

¹ In this document, the acronym "ET" refers to emerging technologies (or the emerging technology sector in general), or to the activities of an emerging technology workgroup within a single company. The acronym "ETP" refers to the statewide Emerging Technology Program, an organized, collaborative effort of ET workgroup stakeholders from each IOU. The ETP supports increased EE market demand and technology supply by contributing to the development, assessment, and deployment of new and under-utilized EE measures (that is, technologies, practices, and tools).

² See Appendix A for more details.

³ A technology becomes a "measure" when a program manager "adopts" it into an incentive program. For custom projects, "adoption" occurs when the incentive application is approved.

⁴ This is verified in a recent evaluation of the ETCC website (the primary means by which ETP disseminates its reports): only 7 of 81 survey respondents said they were just ET consumers, while all others categorized themselves as EE professionals, ET developers, vendors, manufacturers and distributors. The evaluators concluded that ETP was successful in reaching its intended target audience. (*PY2013-2014 Emerging Technology Program Targeted Effectiveness Study Report*, ODC, 2015)

ETP is designed to help program administrators meet the energy reduction needs California through cost effective measures that deliver reliable energy savings. ETP supports the ambitious objectives in the California Strategic Plan and legislative initiatives by directly supporting the Codes and Standards program and IOU customer programs designed to meet those objectives. An innovative technology requires an effective incentive program to gain traction on the market; without this ETP's efforts would merely be an interesting academic exercise. As a non-resource program, ETP provides information to program managers and designers who make the ultimate decision of which technologies to offer through incentive programs; these program managers also design market interventions to promote customer use of EE technologies. ETP itself does not conduct any market interventions or directly achieve market transformation.

In the technology development continuum that spans the range from initial ideation, through research and development (R&D), to prototyping and ending with commercialization, ETP's contribution is during the technology assessment and validation stages, usually post-commercialization. ETP depends on technology developers and manufacturers to create new technologies and potential products for consideration in PAs' resource programs and/or codes and standards portfolio. ETP itself cannot innovate new products and is not a technology research and development (R&D) program. On the other end of the continuum, ETP relies on program implementers to conduct marketing and outreach around new measures; ETP is not designed to provide product information directly to the mass market as do consumer product testing entities such as Consumer Reports or CNET Reviews. Finally, ETP does not provide nor set incentives for the measures. It is important for stakeholders to understand ETP's role so that its achievements and boundaries can be recognized. In an environment where portfolio cost-effectiveness is harder and harder to achieve, and every ratepayer dollar must be carefully directed, ETP's ultimate role is to help PAs and program designers of California ratepayer-funded programs to decide which technologies can meet California's energy needs. It is also important for stakeholders to understand that technology development is a non-linear process.

1.2 Changes in ETP design

ETP's three core strategies (corresponding to its three subprograms) remain the same but will be coordinated and optimized through statewide administration. The Statewide (SW) ETP activities will be guided by new Technology Priority Maps (TPMs), which will be developed by a single SW PA with input from the other utilities. These TPMs will include technologies that are candidates for market transformation interventions and for codes and standards.

The new coordination and optimization will require one to two years to ramp up due to a need to develop the TPMs as well as the new program data tracking infrastructure needed to implement the program as a statewide program'. However, the ETP is structured so that this ramp up period should have little impact on ETP's functions.

Historically, the ETP allocated approximately 40-45% of the budget to Technology Assessment (TA), 45-50% of the budget to Technology Introduction Support (TIS), and 5-15% of the budget to Technology Development Support (TDS). The SW ETP has four overarching objectives to reflect the new statewide nature of the ET Program.

1.3 ETP's three objectives

The ETP has been redesigned to be responsive to D.16-08-019, which specifies that ETP be administered as a SW program. The four IOUs will address the following three overarching objectives:

1.3.1 Objective 1: Use Technology Priority Maps (TPM) to ensure high priority areas are met

To address the need “to ensure all high priority areas are addressed⁵”, the SW ETP will use collaboratively designed TPMs to drive the ETP research agenda during the five-year period in this business plan. SW ETP will use existing technology roadmapping efforts whenever possible to create TPMs to align with California policy and customer needs. These TPMs will seek to identify good candidates for all utility programs including market transformation initiatives (such as Codes and Standards).

1.3.2 Objective 2: Support a healthy technology pipeline

The SW ETP projects will be designed to encourage manufacturers and technology developers to create technologies that help PAs achieve their energy efficiency goals.

1.3.3 Objective 3: Reduce risk to utility programs

The SW ETP technology assessment projects will also be designed to ensure that the technologies and solutions the PAs offer will have verifiable energy savings. This is accomplished in part by early vetting of technologies and solutions that are candidates for inclusion into an EE portfolio. These assessment activities are designed to help program managers create measures that have a more robust level of assured savings.

1.4 Why ETP is needed

To support PAs effectively, the statewide ETP conducted over 300 technology assessments and over two dozen demonstrations and showcases in the 2013-2015 program cycle. These efforts have supported the development or enhancement of numerous new EE program measures, education programs, and codes and standards. Equally importantly, these efforts have filtered out inappropriate technologies that are not suited for California ratepayer programs, allowing program designers and implementers to direct limited resources to measures with reliable savings.

This work is an important component of utility EE efforts for numerous reasons. First, California's ambitious energy savings and greenhouse gas reduction goals coupled with the continuously declining costs of generation place great pressure on ratepayer programs to stay cost effective. Program implementers assume much of the portfolio risk that is inherent with offering any new or unproven technologies to customers, which can manifest in evaluation studies as low realization rates.⁶ By managing some risk through vetting by ET programs, EE PAs maximize their impacts and cost-effectiveness.

⁵ D.16-08-019, p. 63, Footnote 23

⁶ CITE

ETP and Market Transformation. D.16-08-019 requires SW programs to be designed to achieve market transformation. Because ETP does not intervene in the market, it is not able to achieve market transformation on its own. However, it can provide critical support to programs that do intervene in the market. ETP is ideally suited to support market transformation in three specific ways.

- 1) The SW ETP will support market transformation by helping to “bring the next generation of even more efficient technologies, processes or design solutions to the market”⁷ ETP will do this by working with technology developers and manufacturers to design specifications for new products. ETP has done this in the past through individual projects with manufacturers as well as through strategic cross-IOU collaborations, including the Western HVAC Performance Alliance (WHPA, <http://performancealliance.org/>), which was created by a SW IOU task force including ETP. WHPA has contributed a number of standards and updates to ASHRAE Standard 90 and Standard 180 and Title 24.
- 2) The SW ETP can also help “bring the next generation of even more efficient technologies, processes or design solutions to the market” through the TIS subprogram. While ETP’s TIS efforts are on a small scale and not expected to reduce market barriers measurably, critical data can be gathered to inform future ET studies as well as inform program designers about a technology’s market viability.
- 3) The SW ETP will support market transformation by continuing to conduct studies in collaboration with the Codes & Standards program so that technologies can be adopted into codes and standards. ETP is a long-standing partner to the Codes & Standards program in their efforts to gather data for Codes and Standards Enhancement (CASE) reports.

Although ETP can be the utilities’ first step in initiating market transformation for efficient technologies, which can eventually end up with the higher efficiency technologies becoming a codified baseline, Figure 1 shows that the utilities draw from multiple sources throughout their program portfolio. PA incentive programs can draw from many sources for new measure ideas, the ETP being one source. Likewise, the Codes & Standards Program can draw from multiple sources for new potential codes, with PA incentive programs being one source. In some cases Codes & Standards can bypass the process of vetting the technology in the market, which accelerates code development but may increase the risk that the technology is not viable in the market.

⁷ CITE

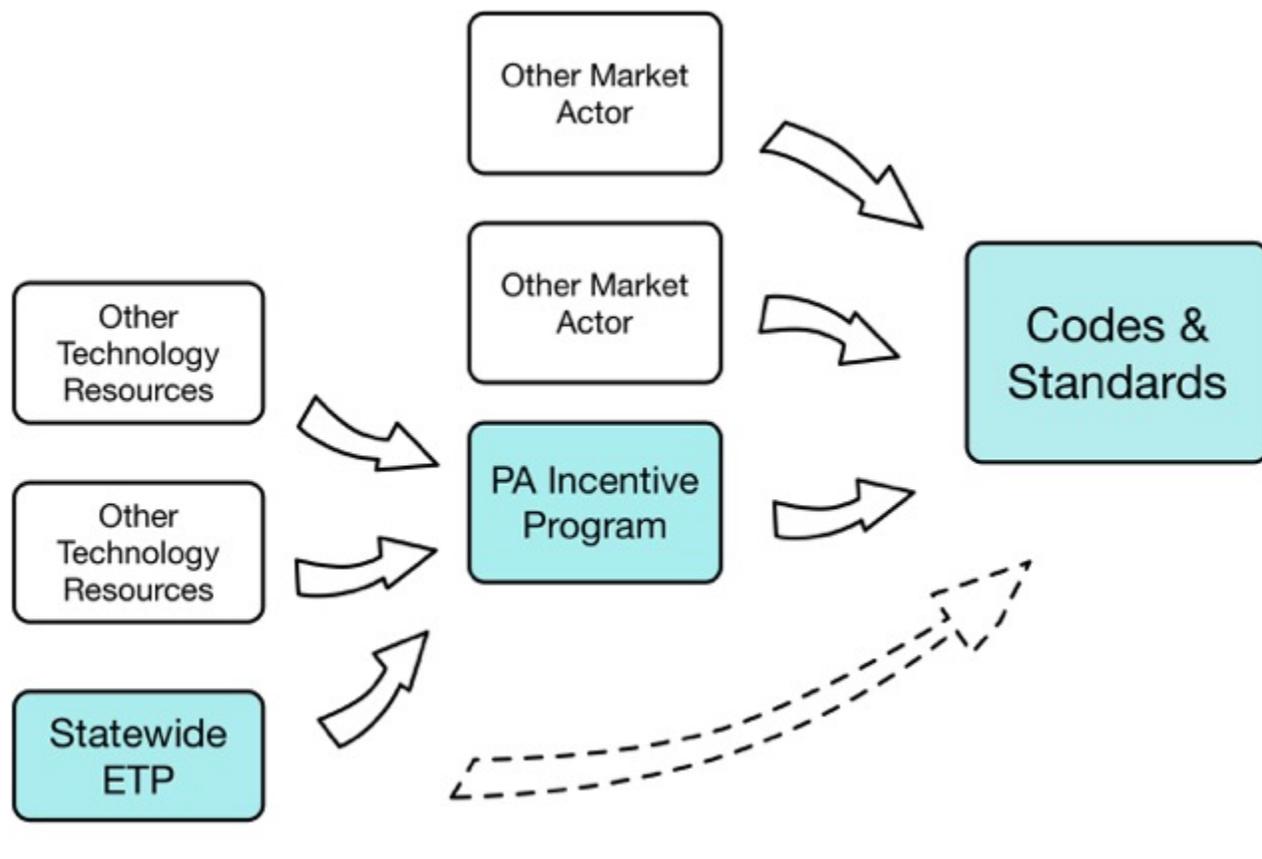


Figure 1: Programs use multiple sources of ideas for new measures; C&S uses multiple sources of ideas for new codes.

2 Vision

2.1 Trends and drivers

The statewide ETP is working to leverage various emerging industry and policy trends. These trends reflect an evolving marketplace where previously complex solutions have become technically feasible, where data are gathered and used in new ways, and where products go beyond simple "plug and play" gadgets and become complex, interrelated ecosystems.

One of the most far-reaching trends is the increasing interplay between the ETP's traditional role of supporting EE efforts and its growing role in supporting other utility activities, such as distributed generation, demand response, and energy storage. This new integration of activities offers utilities the potential to provide greater value to customers by moving to a model of DSM procurement that can address grid needs flexibly in real time.

Figure 2. Whole Building Solutions Diagram

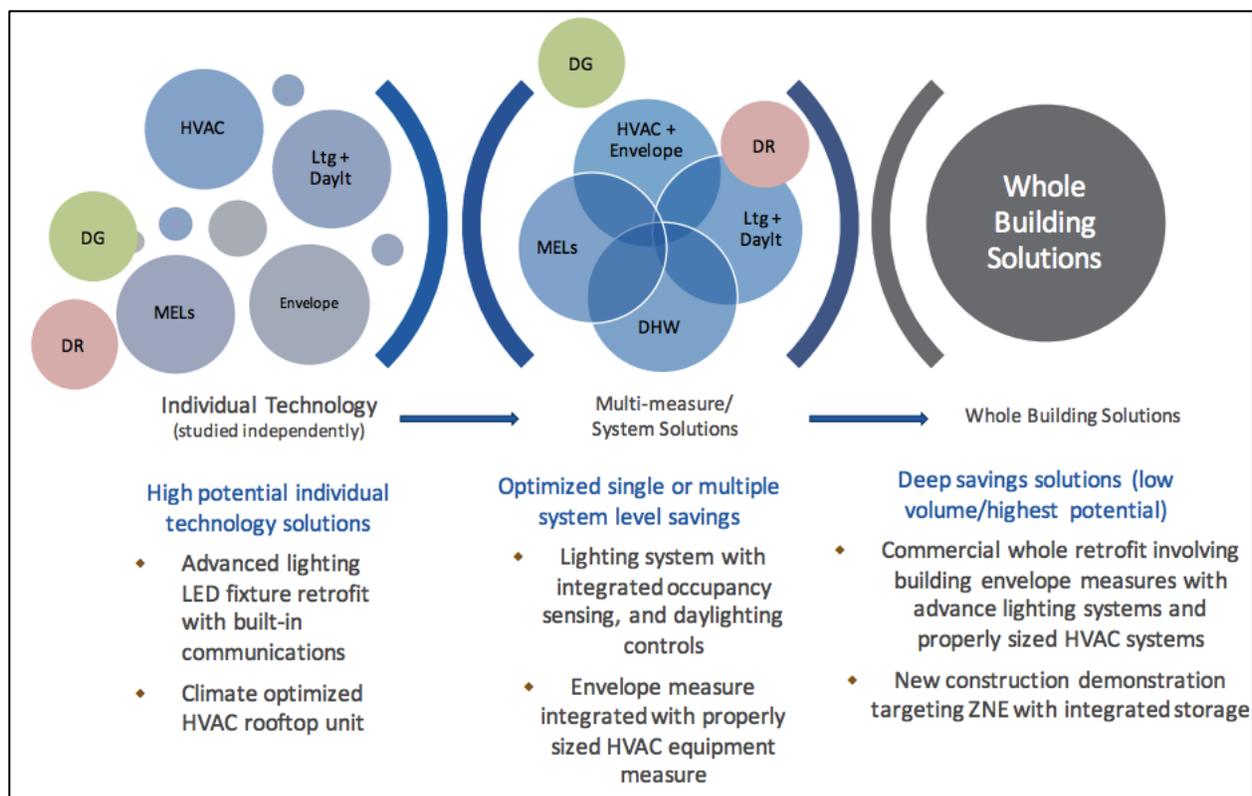


Figure 2: Over the years, the ETP has evaluated many individual technologies that save customers energy, including advanced lighting and HVAC products (left). Because repeatedly reaching customers with one-time EE measures can be difficult, the ETP also pursues integrated solutions that bring together several stand-alone technologies into a single package (center). Deeper savings can be realized by going beyond integrated systems to offer whole-building solutions (right). Treating a home or commercial building in a holistic manner can have additional customer benefits, such as added controls, increased comfort or making achieving energy goals easier.

Moving forward, the ETP will continue activities in all three areas depicted in Figure 2 but will strive to deliver more precisely-targeted solutions that are tuned to a customer's specific needs and energy savviness, while also supporting a larger engagement strategy. In turn, the understanding gained of how various customer markets embrace different EE strategies will help the ETP further refine technology delivery approaches.

Another trend relates to data analytics. There has been a proliferation of new data streams (energy usage via mobile apps and consumer "big data") coupled with new analytical tools. One example is Green Button, a White-House-led initiative that can provide residential and business customers' energy usage data to third party vendors, thus empowering the customers to make better, data-driven energy decisions via new value-added services. These new tools and data can potentially streamline and accelerate ET and support Measurement and Verification (M&V) approaches.

Furthermore, understanding data streams and using them better allows utilities to unlock greater customer savings by developing new behavioral programs and/or augmenting existing ones. A host of new products in this area, such as energy management systems (EMS) that intelligently optimize a building's operations in real time, are showing early success in targeting customers

and delivering savings in the residential and commercial sectors. EMS have become increasingly powerful in recent years with the proliferation of inexpensive building sensors, enhanced wireless communication capabilities, and increasingly intelligent automation and analytical functionality.

Another important technology trend is the evolution of product life cycles. As more devices are connected to the Internet, traditional "widgets" can now be upgraded through a simple software update, which means that older products can always have the latest software features. This can have implications for both market adoption and savings potential. The software development cycle is faster than for hardware, so the marketplace now evolves more rapidly, and because installing new software costs much less than hardware, this evolution could reduce adoption barriers by enabling product upgrades instead of replacements. Additionally, software patches can convert an already-installed technology instantly to a new product with totally different energy characteristics that adapts to changing needs.

These technology trends could enable a shift away from stand-alone technologies to thinking more holistically about multiple systems or entire buildings. There is interplay between different systems in a building, such as a lighting system that works in conjunction with an HVAC system to meet certain energy strategy while maintaining service levels.

By thinking about building systems holistically, it is possible to design spaces so that newly added components don't interfere with the energy savings or other operational parameters of existing components. Furthermore, as utility EE portfolios mature, many of the easy energy savings opportunities for individual products are no longer available. Though not yet practiced widely, bundling a set of technologies that individually offer low savings potential into one large package will allow utilities to tap into a wealth of new operational synergies, leading to new savings opportunities.

2.2 Gaps and barriers

Three categories of barriers challenge work in the ET sector: technical barriers, market barriers, and policy and regulatory barriers. Though challenging to overcome, leaving these issues unaddressed hampers ET activities and limits the potential success of utility EE programs. Furthermore, many of these gaps and barriers present potential opportunities for ETP and some of the wider efforts it supports. For a full description of those and other opportunities, refer to the section "Long Term ETP Opportunities."

Because ETP is not a customer-facing program, it cannot intervene in the market to overcome most of the market barriers. The market barriers below are ones in which ETP has an opportunity to contribute to interventions from the customer-facing programs.

2.2.1 Technology barriers

- Based on ETP's experiences, ETP observes that there is a lack of interoperability among systems in the absence of industry standards⁸, and
- ETP observes that there are digital barriers, such as cybersecurity or data format integration.

⁸ Cite grid alliances, Zigbee Alliance.

2.2.2 Market barriers

- Reluctance of retailers, trade allies, and/or contractors to embrace new technologies that require unwanted changes in their business models⁹. (For example, a plumber making a service call might encourage a customer to purchase a less-efficient traditional water heater because the plumber is unfamiliar with the installation requirements for a more advanced, higher-efficiency heat pump water heater.) ETP can help WE&T address some instances of this market barrier by helping to design courses that help train contractors on proper installation methods.
- Split incentives¹⁰ between tenants and landlords can hinder adoption of EE technologies in rental properties. ETP can help the Codes & Standards program with development of new codes that require the installation of high efficiency equipment.
- IOUs may not understand customer needs or market drivers well enough to deliver appropriate offerings. ETP can help resource program managers by conducting customer research on specific emerging technologies to reduce information costs¹¹ of understanding customer responses to those technologies¹².

2.2.3 Policy and regulatory barriers

- Evolving policies for behavioral interventions. ETP can help inform policy makers by gathering data and developing tools to help measure impacts of behavioral interventions. In 2016, ETP developed a validated scale that can be used to measure the relative effectiveness of different behavioral interventions¹³.
- Policies that can slow digital innovation, such as current customer confidentiality regulations that limit access to AMI data¹⁴. ETP can help by working with vendors that allow customers to access their own data while anonymizing customer data to the vendor.
- Different proceedings¹⁵ for EE, Demand Response (DR), and Distributed Generation (DG) programs create funding silos and prevent coordination of integrated DSM (IDSM) projects and customer incentives. ETP can help by testing energy management systems that can accommodate EE, DR, and DG technology, in anticipation of policy updates that remove those funding silos.

The statewide ETP continues to address these barriers by evaluating technical performance and product readiness (scalability), providing market data to facilitate better EE program design, and will be supporting the development new measurement and verification.

⁹ Eto, Schlegel, and Prahl, 1996.

¹⁰ Ibid.

¹¹ Ibid.

¹² Note that market characterization studies that include uncovering market barriers and describing supply chains are under the purview of EM&V. ETP does not conduct market segment characterization studies, but instead conducts limited customer research specific to a particular emerging technology.

¹³ <http://etcc-ca.com/reports/dimensions-energy-behavior-psychometric-testing-scales-assessing-behavioral-interventions>

¹⁴ These issues are currently being addressed by the CPUC Energy Data Access Committee, <http://www.cpuc.ca.gov/General.aspx?id=10151>

¹⁵ Cite proceedings here.

2.2.4 Support for regulatory and legislative initiatives

Through ETP's direct support of the portfolio, the ETP also works to advance underlying state initiatives and policies, including SB 350, AB 802, and AB 793. Chief among these is the California Long-Term Energy Efficiency Strategic Plan (CLTEESP), which describes such major long-term initiatives as transitioning the state's building inventory to Zero Net Energy (ZNE), accelerating the development and adoption of next-generation lighting and HVAC technologies.¹⁶ Overall, 86% of ETP projects align with CLTEESP, according to an evaluation commissioned by the Energy Division¹⁷. ETP, however, cannot be described as directly answerable to these legislative initiatives because all energy savings objectives are delivered through resource programs; ETP is not a customer-facing program and does not intervene in the market.

In addition to the overarching CLTEESP, ETP is working to support a number of more focused state policies, including:

- AB 802, which includes "to-code" improvements for underperforming buildings (stranded savings), facilitates enhanced access to building performance data, and paves the way to meter-based savings for customers. In some cases, meter-based savings can require extensive submetering, and ETP has begun to assess micro current transformer (micro-CT) sensors that may someday provide inexpensive and accurate submetered data.
- SB 350, which seeks to double efficiency goals in the state's building stock by 2030. ETP sees integrated solutions as a key path towards doubling energy savings.
- AB 793, which seeks to enable smarter energy management through advanced technologies. ETP continues to assess data display and presentation solutions that can drive residential and non-residential energy savings.

¹⁶California Energy Efficiency Strategic Plan, January 2011 Update, §2.1.1.

¹⁷ Calmac, 2015 <http://tinyurl.com/gtpjv8r>

3 ETP Program Model

3.1 The SW ETP will continue the three core strategies

The Statewide ET Program will continue to use the three core strategies that form the basis of ETP's three subprograms: the Technology Development Support (TDS), Technology Assessment (TA), and Technology Introduction Support (TIS) subprograms.

3.1.1 Strategy 1: Support Technology Developers

In an effort to sustain or increase EE technology supply, ETP seeks opportunities to support EE technology development. During TDS, ETP works with technology developers to assist them in taking early-stage technologies or concepts and transforming them into market-ready products, helping bridge the gap between R&D and the market. An example of a support effort would be the development of performance specifications for a technology allowing manufacturers to better target their development efforts. The TDS process has contributed to the development of more energy efficient technologies such as televisions, computer monitors, illuminated signs, and lighting fixtures.

ETP also provides training and networking for entrepreneurs and companies offering energy saving technologies at Technology Research Innovation Outreach (TRIO) events. TRIO is designed to encourage submission of ET project ideas using new, innovative technologies by providing information to entrepreneurs, universities and investor firms to help them understand the utility environment. These outreach events also educates technology developers on tools necessary to develop cost-effective energy efficiency and integrated demand-side management technologies, programs or professional service support.

Because technology developers are sometimes inexperienced in working with utilities and DSM programs it is important to engage them early in the development phase to maximize product impacts and ensure a healthy pipeline of measure-ready technologies. ETP will continue to support technology developers in the following ways:

- Work with product developers during the design phase to include energy performance specifications that would make the products appropriate for incentive programs, and
- Motivate product developers to build integrated solutions.
- Develop a long-term vision to identify market gaps for technology innovation
- Enhance partnerships with the California Energy Commission (CEC) Electric Program Investment Charge Program (EPIC) and Public Interest Energy Research (PIER), as well as the U.S. Department of Energy (US DOE) and other out-of-state partnerships.

Implementation metrics will be detailed in the Implementation Plans, but may include tracking activities such as the number of technology development projects launched and number of outreach events held around research priorities.

3.1.2 Strategy 2: Assess Technologies

ETP's core competency is in assessing the performance claims and overall effectiveness of energy efficient measures that are new-to-market or under-utilized. These assessments may build on data or information from testing at customer or field sites, laboratory testing, or other primary research studies. Assessments can also generate the data necessary for energy efficiency rebate programs to estimate energy savings over the life of the measure. These assessments support the entire program portfolio, from incentive programs to market transformation initiatives (including the Codes and Standards program).

Assessment proposals are screened before an assessment is initiated. In the new SW PA model, ETP will develop a common set of screening criteria. These may include consideration of:

- The measure's alignment and projected contribution to energy efficiency program strategies and California Energy Efficiency Strategic Plan goals,
- The degree to which the assessment impacts the measure's adoption rate
- The information necessary for energy efficiency program inclusion and the effectiveness of an assessment in producing this information
- Resources necessary to execute the assessment.

The CA IOUs have developed state-of-the-art test facilities staffed with knowledgeable engineers and scientists to ensure that technology lab assessments are conducted properly. These facilities focus on a variety of key end-use measure types, including refrigeration, lighting, water heating, and air conditioning.

Technology assessment efforts seek to address measure development barriers. In doing so, it allows EE portfolios to evolve to be more solution-driven rather than the traditional technology-driven approach. Specifically, the ETP TA activities include:

- Working to develop a framework that transitions away from the traditional DSM model to consider DSM as a grid resource, and
- Studying advanced methods to evaluate savings, particularly with integrated or whole-building solutions.
- Conducting customer segment-focused studies in support of solution-based interventions
- Conducting studies focused on the performance of integrated solutions and/or meter-based approaches, and
- Supporting development of new, targeted, technology-based measures for EE programs.

Implementation metrics will be detailed in the Implementation Plans, but may include tracking number of customer segment-focused studies in each relevant business practice area, number of studies of the performance of integrated solutions and/or meter-based approaches, and

number of measures offered by programs that were directly supported by ETP studies. Note that ETP does not make the final decision on which measures are offered by programs.

3.1.3 Strategy 3: Support Market Introduction of Emerging or Underutilized Technologies

ETP's support of market introduction projects has the dual objectives of gathering in-situ data on customer experiences while increasing market exposure or awareness of emerging and underutilized technologies. Introduction efforts may include demonstration of the energy savings potential of individual technologies (or a group of technologies) to assist in market penetration. The ET Program may also assemble the appropriate market actors for first-hand experiences with new technologies in real world settings or educate contractors on the benefits and proper installation techniques of new technologies. Additionally, the Technology Resource Innovator Program (TRIP) administers targeted, technology-focused solicitations in order to pair underutilized, market-ready technology providers with experienced third-party implementers. These early introduction activities are conducted on a limited scale to control the variables that would affect customer experiences.

- Once products reach the marketplace, EE programs employ ETP-gathered data to inform incentive structures and address gaps in customer knowledge, and
- By seeking to understand the non-energy benefits of new technologies, the ETP can identify additional drivers for adoption, such as enhanced security, comfort, or productivity.

ETP's efforts help overcome traditional market barriers and move toward a more comprehensive portfolio by developing a robust suite of integrated solutions for deeper savings, while simultaneously retaining traditional measures. Specifically, the ETP's technology introduction support efforts include:

- Supporting a pipeline of opportunities for the EE portfolio that balances traditional measures and products with integrated solutions.
- Supporting development of new methods to calculate energy savings from integrated and whole-building solutions
- Conducting market studies focused on barriers to and drivers toward adopting integrated solutions
- Conducting small, targeted field deployments to test innovative offerings around integrated solutions, and
- Continuing to pursue traditional ET business roles in technology assessment that validates performance

Implementation metrics will be detailed in the Implementation Plans, but may include tracking number of market studies focused on barriers to and drivers toward adopting integrated solutions, and number of field deployment studies.

These future opportunities, solutions, and strategies build on years of ETP success in effectively supporting EE efforts that help bring new products to market. Among the past successful ETP initiatives are work on:

- LED streetlights
- Advanced lighting controls
- Advanced rooftop packaged units
- Ventilation controls
- Fault detection and diagnosis tools
- ZNE demonstrations
- Tankless hot water heaters
- Ozone laundry, and
- Tier 2 advanced power strips.

In the wake of successful market adoption of these solutions, the statewide ETP is now gearing up to pursue the future opportunities described above.

3.2 Technology Priority Map (TRPM)

At the core of this Statewide approach will be the Technology Priority Maps (described in Section 6), a planning instrument developed by the SW PA which will “ensure all high priority areas are addressed” by aligning activities across the state with the priorities outlined in the Maps.

ETP uses the term “technology research priority map” because the term “technology roadmap” is too prescriptive for a rapidly evolving *measure* landscape. ETP believes that over the period covered by this business plan, the continuously decreasing costs of centralized generation will make many traditional measures no longer cost effective, necessitating the creation of new avenues to achieving energy savings. One such new avenue was created with AB 802, which allows claiming of stranded savings¹⁸, which can be claimed without any emerging technologies at all. As research priorities change, TPMs and associated projects can be sunsetted without penalty to decrease program costs.

The TPMs will be developed after a review of each PA’s existing ET roadmaps, and will leverage existing technology roadmaps from other entities such as CEC, EPIC, and DOE. ETP also intends to ask the ETCC Advisory Council for their insights on technology research priorities, and will also seek stakeholder input on these priority maps.

¹⁸ Stranded savings refer to the savings potential of replacing old, highly inefficient equipment with equipment that meets current codes. Prior to AB 802, only equipment with above-code efficiency have qualified for rebates or incentives .

ETP expects that the TPMs can be developed within the first year of the new SW model. It is important to note that each IOU already has internal technology roadmaps that they have been using to meet the needs of their own utility. During the initial TPM map development period, each IOU will continue to use their own maps, which should merge seamlessly with the TPM, once developed. After the initial TPMs have been developed, updates will occur at least once per 5-year business cycle, or more frequently on an as-needed basis if all PAs agree.

The ETP is and will continue to be proactive in seeking out new technologies. This is accomplished through a variety of channels, including through partnerships, market scanning activities, attending conferences, and employing subject matter experts in specific technology areas. This allows the ETP to uncover market trends, determine which technologies have high potential, and present only technologies with reliable energy savings to program administrators.

ETP recognizes that the TPMs should follow development of new technology or measure trends, and will not rigidly follow a TPM for the sake of adherence. However, ETP intends to draw upon the expertise of advisors such as the Emerging Technologies Coordinating Council (ETCC) Advisors when considering whether to sunset a TPM and its associated projects. ETP will also seek stakeholder feedback before making a final decision.

4 Collaboration, Outreach, and Information Dissemination

To advance the goals of the ETP, provide added transparency, and create a technology marketplace the ETP engages in a number of outreach and information dissemination activities.

4.1 Emerging Technology Coordinating Committee (ETCC)

The primary avenue for collaboration among ETP members is through the Emerging Technology Coordinating Committee (ETCC). ETCC's coordination strategy is to bring together member utilities (including their ET and ET-related departments, such as EE, DG, and DR), national and international ET groups, and technology stakeholders in order to provide a common framework for assessment, reporting, and program development.

This strategy has had a beneficial outcome in reducing duplicate efforts in technology development and assessment, product introduction support, and vendor relationships. Furthermore, by combining the efforts of multiple major utilities, this kind of collaboration can help achieve the "critical mass" that encourages developers and manufacturers to develop CA-appropriate technologies.

ETCC activities include a number of outreach components to ensure that the statewide ETP works in as transparent and effective a manner as possible. To that end, ETCC holds quarterly meetings around the state that are aimed at particular customer segments (commercial, residential, industrial, agricultural, and integrated systems) with the goal of highlighting innovation in each sector.

The ETCC also holds a major conference — the ET Summit — every two years that brings together over 500 emerging technology stakeholders, including leading experts, product developers, entrepreneurs, regulators, investors, delegates from government agencies, gas and electric utilities, and academia.

Other ETCC events include symposia that educate third parties on doing business with utilities, Open Forums that serve as platforms for tech companies to introduce their products to utilities,

and regular ETCC Advisory Council activities that bring North American utility and industry ET voices to the ETCC.

4.2 Third party solicitations

The Technology Resource Innovator Program (TRIP) administers targeted, technology-focused solicitations in order to pair under-utilized, market ready technology providers with experienced third party implementers. TRIP aims to achieve greater market acceptance of new technologies through customer incentives, education, and technical assistance to help overcome market barriers. Participants in the TRIP program may include entrepreneurs, third party vendors, investors, EE and DR companies, and universities. Winning bidders will be funded by ETP and their contracts will be managed through the IOU third party programs.

In addition to TRIP, ETP has supported IDEEA365 solicitations by reviewing bids that include an emerging or underutilized technology, and when appropriate, has considered non-winning technology vendors as candidates for partnering on technology assessments.

4.3 Other ET Collaborations

Though ETCC is the largest collaborative effort across the ETP, the constituent utilities are highly active in a number of additional consortia, initiatives, and groups. Partners of these collaborative efforts fall into six categories:

1. Technology adopter groups, including owners, tenants, and property managers.
2. Utility stakeholders, including utility ET groups in California and other states as well as non-ET utility stakeholders, such as staff working on electric vehicles (EVs), energy storage, and distributed generation, and utility marketing, legal, and regulatory departments.
3. Research entities, including the Lighting Technology Center, Western Cooling Efficiency Center (which was co-founded by the IOUs and UC Davis), national laboratories, and the Advanced Research Projects Agency-Energy (ARPA-E), as well as individual researchers funded by the US DOE.
4. EE technology commercialization actors, including technology developers and financiers as well as clean tech accelerators such as:
 - US DOE's FloW (First Look West, a regional component of US DOE's National Clean Energy Business Plan Competition)
 - Cleantech Open (a nonprofit organization for clean tech entrepreneurs), and
 - The CalSEED (California Sustainable Energy Entrepreneur Development) Initiative.
5. The CEC's Efficiency and R&D Divisions, including the EPIC and PIER programs.

6. Strategic organizations and consultants, including the Consortium for Energy Efficiency (CEE), E Source, New Buildings Institute (NBI), American Council for an Energy-Efficient Economy (ACEEE), Davis Energy Group, Fisher Consulting, Electric Power Research Institute (EPRI), Gas Technology Institute (GTI), and engineering firms.

ETP has a long history of strategic collaborations both across utilities and with the entities listed above. Some recent successes include:

- a. Western HVAC Performance Alliance (WHPA, <http://performancealliance.org/>), described earlier.
- c. West Coast Utility Lighting Team (WCULT), which is a spin-off of ETP that originally addressed technical issues in lighting and then expanded to address program operation and lighting market barriers across five states.
- d. ET Lighting Group (as yet unnamed), a spin-off of WCULT that returns to its technical roots. Research on emerging lighting technologies had taken a back seat as WCULT expanded to address programmatic issues.
- e. Energy Efficient Laboratories, the electric utilities recently started a collaboration with the Center for Energy Efficient Laboratories and have to date funded a market research study on energy efficiency in laboratories. This market study will inform a research priority map to guide future ET projects in this field.

4.4 How Does the ETP Support Other Utility Efforts?

The ETP supports the EE program portfolio in several ways. Utility programs benefit from reduced savings risk: ETP provides key support in identifying technology trends by scanning and evaluating new technology opportunities in a robust, deliberate manner that helps mitigate the risks of adopting new EE measures. This ensures that a reliable, predictable resource base exists for EE efforts. By identifying products that are too immature for the market, ETP activities can mitigate the risk of underperforming technologies.

4.4.1 ZNE

ETP provides core support to ZNE and also collaborates with ZNE on projects: California's ambitious ZNE goals include recommendations to build new, resilient buildings and improve existing buildings and communities that not only provide comfort and low operational costs to occupants, but support enhanced grid reliability¹⁹.

ETP has worked closely with the building and design community to construct residential communities and retrofit commercial buildings that demonstrate value to both the owners and occupants, as well as the capabilities to reduce and dispatch electric loads in real-time to address grid constraints and needs. The results from those initial efforts have demonstrated benefits to the grid, while attracting the building and design community.

4.4.2 Customer programs as grid resources

With the rapid increase of both utility-scale renewables and behind-the-meter²⁰ (BTM) distributed energy resources (DER) on the grid, it is becoming increasingly challenging to manage the imbalance between power supply and demand in real-time, particularly because the balance can fluctuate within seconds. These fluctuations occur at both the system-wide level and at the neighborhood level (e.g. substation, transformer). Fortunately, ETP can play a role in helping to overcome such grid challenges by working in concert with programs and technologies on both sides of the meter to deliver resources capable of responding to grid needs.

4.4.3 How ETP collaborates with other programs

In the vision of Integrated Demand Side Management (IDSMS), PAs can combine different types of BTM technologies into one incentive program for end customers. In such a scenario, EE technologies would combine on-site solar, battery storage, and/or traditional and new demand-response technologies. Such a system would provide dispatchability of certain loads (e.g. lighting, HVAC) and the battery systems for both the utility and the wholesale markets.

One strategic way to align those efforts would be to place the IDSMS-capable technologies into the SW ETP Technology Research Priority Map (TRPM) and run joint technology assessments, scaled projects, and demonstration showcases together with the other BTM teams, when applicable. ETP has and will continue to coordinate with DSM in the future, including:

¹⁹ California Long Term Energy Efficiency Strategic Plan, CPUC, 2011.

²⁰ "Behind the meter" refers to any activity, technology, or infrastructural elements that occur before electricity or gas enters a customer's home or business through the meter. This includes centralized generation and transmission, grid management, and utility storage.

- Collaborating with Demand Response (DR) and EM&T programs to discover and validate technologies that provide value in terms of reduced energy consumption during peak hours. One of many examples of such a technology is Energy Management Systems (EMS).
- Researching the potential of combined building EMS, solar, storage, and DG for the small- and mid-sized commercial segment. This research could not only validate energy savings, but may also help to better understand the customer value of these combined systems and highlight potential barriers to adoption.
- ETP has collaborated with Electric Vehicle (EV) teams to understand the EV charging infrastructure with the eventual goal of delivering effective energy management options using advanced controls that will facilitate time-of-need charging.

4.4.4 TDSM or Locational/Preferred Resources

In the future, IDSM efforts could be targeted to specific physical locations on the grid where there, an effort known as targeted demand side management (TDSM). TDSM greatest value is in allowing for the deferral of capital investments on the grid through targeted load reduction specifically at the place where grid investment is needed (e.g. substations, feeders, transformers, etc.).

Working closely with both the other BTM and grid-side teams, ETP brings an EE element to all locational targets on the grid. This can be achieved through joint pilots in targeted locations, as well as projects to determine which EE technologies are applicable based on load shapes, customer segments, and operational processes.

The ETP also helps enable "Locational DSM" endeavors to increase grid reliability and/or defer infrastructure upgrades by:

- Collaborating with internal groups and other programs, such as the DR and DG programs to identify how demand-side energy management systems interact with the grid, and
- Running field deployments that evaluate relevant technologies such as residential battery storage, combined heat and power (CHP), solar, and building EE technologies.

5 Benefits for Diverse Stakeholders

5.1 Customer benefits

The work of the statewide ETP impacts a diverse array of customers through utility resource acquisition programs across California's geographical regions and market sectors, including the residential, commercial, industrial, agricultural, and public sectors. Regardless of location or segment, the most important customer needs are for comprehensive solutions and low costs.

However, ETP itself is not a customer-facing program. Rather, it supports the utilities by ensuring the availability of appropriate measures for customer incentive programs. Because energy is a low priority for many customers, bundling energy-saving opportunities together into multi-measure or whole-building offerings and offering upstream and mid-stream solutions are effective strategies to achieve savings goals. To reach these goals and help utilities serve customers effectively, ETP evaluates technologies that support the development of new, cost-effective EE measures while helping to sustain legacy programs.

The ETP's work can impact customers indirectly. End-use customers can benefit through the reduction in time it takes viable new products to enter the marketplace due in part to ETP's assurance to program managers that an emerging technology is suitable for their program. However, the baseline for the counterfactual is extremely difficult to establish: evaluation studies assessing the effectiveness of utility incentives in accelerating CFL adoption rate in California had difficulty finding a comparison state due to California's progressive populace. Also, because ETP does not set incentives or design outreach, the ultimate adoption rate is not within ETP's sphere of influence.

5.2 Partner benefits

5.2.1 Internal Partners

The ETP program collaborates closely with other utility departments, such as C&S. This collaboration can help advance mutual goals, such as understanding motivations and overcoming barriers among home buyers and builders in order to meet ZNE mandates.

Additional collaborative efforts between ETP and C&S may include:

- Joint memberships in organizations such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), which brings together emerging technology experts, leaders from the HVAC industry, and C&S specialists to advance new equipment, building, and testing standards.
- Seeking out and evaluating emerging "code-ready" technologies that present such rapid adoption potential that they can become baseline much sooner than most other technologies. Because these efforts impact both groups, they work closely to share data and ideas for achieving maximum internal efficiencies and streamlining the adoption process. Because code-ready technologies vary in their impacts and applicability, there is no linear template that can be used for this process.

Elsewhere, there is significant collaboration between the statewide ETP and the Workforce Education and Training (WE&T) Program. The ETP shares data, identifies barriers, and provides technical information to supplement WE&T outreach and education efforts.

The collaboration between ETP and WE&T also includes helping raise awareness and advance understanding of California's ZNE efforts. As utilities turn to more integrated and whole-building EE solutions, ETP and WE&T will collaborate by examining barriers to and drivers toward adopting integrated solutions. The information gathered will be useful for future education and training programs for homebuilders, commercial architects, facility operators, and trade allies.

5.2.2 External Partners

CEC

The CEC and ETP have partnered on a variety of projects and initiatives. The CEC is a member of the ETCC, along with the major California IOUs. Additionally, the CEC has funded some ETP activities, such as alternative programs aimed at training unemployed workers for jobs emerging in the recovering economy.

Cal TF

The California Technical Forum (Cal TF) is a panel that seeks to review energy savings estimates and technical performance related to California's EE programs. As a new organization, Cal TF hasn't yet collaborated closely with the ETP but future partnership opportunities will be examined as they arise.

5.3 Community benefits

Beyond traditional technology evaluations and market interventions, the statewide ETP serves other beneficial purposes. One of these is ETP's work on natural and alternative refrigerants. Older types of refrigerants found in appliances, air conditioners, and industrial equipment are harmful to the ozone layer and act as powerful greenhouse gases. The ETP supports the phase-out of these compounds by working to verify the viability and energy savings potential of new alternatives.

Another critical issue facing California is an ongoing drought that has strained water resources. Recognizing a link between water and energy — the "water-energy nexus" — the ETP is working with utility agriculture stakeholders to find and accelerate adoption of energy-saving technologies that also deliver water savings.

The ETP also works to support the conversion of the transportation sector away from petroleum to electricity- and natural gas-powered vehicles. The ETP has collaborated with the EM&T Program to understand the charging infrastructure for electric vehicles, with the eventual goal of delivering effective energy management options through advanced controls that will facilitate time-of-need charging.

6 Strategies, Targets, and Milestones

Energy Efficiency Business Plans: Sector Metric Table - Cross-cutting Sector: Emerging Technologies Program								
Problem Statement/ Core Strategy	Desired Effects	Implementation Strategies	Milestones	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
There is a need to "ensure all high priority areas are addressed"	SW ETP will leverage existing technology roadmapping efforts and create/modify technology roadmaps to align with California policy and ratepayer needs.	Sub-strategy 1: Develop and refine Technology Research Priority Maps Tactics to be provided in Implementation Plan	(under development) 1) Complete TPMs 2) Implement TPMs	n/a	n/a	Identify areas with need for TPMs	Assess and update TPMs	Assess and update TPMs
		Sub-strategy 2: Disseminate Technology Research Priority Maps (TRPMs) to stakeholders. Maps will drive SW ETP projects, from the top-down. Tactics to be provided in Implementation Plan: • ETCC meetings, Biannual ET Summit, IDEEA 365/TRIP solicitations, TRIO, Open Forum				Complete and implement TPMs		
There is a need to support a healthy technology pipeline for measure development	The SW ETP projects will be designed to encourage manufacturers and technology developers to create technologies that can be relied upon to meet California ratepayer needs for energy efficiency.	Sub-strategy 1: Work with new technology vendors, manufacturers, entrepreneurs Implementation Plan tactics: • TRIO, CalSEED • Tech Development Support	(under development) • Phase 1 goal: identify need for new technologies and manufacturers/developers willing to partner with ETP • Phase 2 goal: identify ways to support developers in developing or specifying new technologies • Phase 3 goal: Provide support identified in Phase 2 • Phase 4 goal: Identify next steps (lab testing? Pilot testing?) • Phase 5 goal: Hand off to implementer of next steps identified in Phase 4	n/a	Program Tracking Data	All TPM v1.0 projects are identified, assigned and completed, Phases 1-5	All TPM v2.0 projects are identified, assigned and completed, Phases 1-5	All TPM v3.0 projects are identified, assigned and completed, Phases 1-5
		Sub-strategy 2: Work with universities and colleges Implementation Plan tactic: RocketFund						
		Sub-strategy 3: Meet PA requests to work with specific technologies and technology developers, including C&S requests, WE&T requests, etc.						

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<p>PAs have a need to know which technologies would and would not be suitable for incentive programs.</p>	<p>ETP will vet technologies and solutions that aren't yet ready for inclusion into an EE portfolio. These activities result help program managers create measures that have a more robust level of assured savings.</p>	<p>Sub-strategy 1: Conduct TPM-driven Technology Assessments Implementation Plan tactics:</p> <ul style="list-style-type: none"> • Field studies • Lab studies • Demonstrations 	<p>(under development)</p> <ul style="list-style-type: none"> • Phase 1 goal: identify need for new technologies and manufacturers/developers willing to partner with ETP • Phase 2 goal: identify ways to support developers in developing or specifying new technologies • Phase 3 goal: Provide support identified in Phase 2 • Phase 4 goal: Identify next steps (lab testing? Pilot testing?) <ul style="list-style-type: none"> • Phase 5 goal: Hand off to implementer of next steps identified in Phase 4 	<p>n/a</p>	<p>Program Tracking Data</p>	<p>All TPM v1.0 projects are identified, assigned and completed, Phases 1-5</p>	<p>All TPM v2.0 projects are identified, assigned and completed, Phases 1-5</p>	<p>All TPM v3.0 projects are identified, assigned and completed, Phases 1-5</p>
<p>Sub-strategy 2: Test TPM-driven Solutions Implementation Plan tactics:</p> <ul style="list-style-type: none"> • Scaled Field Placements – Data collection on technology performance and customers • Demonstrations – Data collection on technology performance and customers • Showcase – Visitor Surveys <ul style="list-style-type: none"> • TRIP, IDEEA365 								
<p>Sub-strategy 3: Meet PA requests for assessments of specific technologies</p>								

7 EM&V Considerations

7.1 Evaluation Needs Preparedness

The utilities are currently updating the ETP tracking database to include data on both factors under ETP control, such as number of TDS, TA, and TIS projects initiated, as well as factors not under ETP control, such the proportion of technologies filtered out as “not appropriate” vs those as selected as candidates for further ETP assessment, the amount of savings resulting from ETP-vetted measures, length of a project, etc. These updates will meet ETP’s needs in the short term. The ETP database will be designed to track information that can be gathered during the course of program implementation.

ETP’s evaluation needs in the longer term require significant development of additional infrastructure to track coordination and optimization according to the TRPMs, as well as window-of-opportunity projects that may not be on the TRPM.

Evaluation preparedness at the subprogram level will be discussed in detail in the Implementation Plans.

7.2 Considerations for future ETP evaluations

Utility ET efforts are uniquely designed to assume many of the business risks associated with maintaining a highly-effective EE portfolio. ETP is tasked with helping DSM program administrators determine whether a technology would be suitable for incentive programs. ETP will be considered successful if it both identifies potential new measures as well as filters out inappropriate technologies.

As a supply side program, a resource-based impact evaluation can be problematic when applied to ET. Indeed, tying ET to such a model of only counting technologies that are adopted into the measure portfolio discourages the calculated risk-taking upon which the ETP has built a credible, long-term track record. Counting only adopted technologies sets faulty incentives for ETP to only focus on low-risk measures with high likelihood to become IOU program measures. ETP fulfills several functions for the EE portfolio, including identifying and supporting measures with high value-add for the portfolio, but also pursuing some “high risk, high reward” measures. ETP’s program metrics need to track both adopted technologies and filtered technologies, to accurately reflect ETP’s value in preventing “snake oil”, or ineffective technologies, from being offered by program managers.

While the ETP is in favor of tracking the impacts of its work in terms of EE program outcomes, there are additional indicators that should also be considered to accurately gauge its success. Tracking the number of new measures recommended by ETP, as well as their market uptake, is an interesting exercise, yet neither the number of new measures nor their market uptake rate is under ETP’s sphere of influence. ETP evaluations should also take into consideration nationwide trends and challenges, such as the difficulty in finding cost-effective measures for the residential sector, which is not a problem specific to California.

At the sector level, ETP will be considered a success if it meets its four objectives:

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- Objective 1: Use Technology Priority Maps to ensure high priority areas are met
- Objective 2: Support a healthy technology pipeline
- Objective 3: Reduce risk to utility programs

Ultimately, evaluations that keep in mind what ETP can and cannot control will deliver findings of most help to ETP.

Appendix A: Who does ETP serve?

The ETP serves resource acquisition programs as they develop new measures. Additionally, ETP supports C&S, gathering data for CASE studies. ETP operates where emerging technologies and utility programs intersect. This section describes the needs of internal utility customers, the utility measure development process, and some characteristics and trends in the energy-efficient technology landscape to provide a better understanding of the context within which ETP is implemented.

7.2.1 The utility measure development process draws across multiple business functions

Measure development refers to the process by which DSM program administrators decide which technologies to include in the incentive programs. A clear distinction needs to be made between an energy efficient technology and a measure, which has passed through utility review at multiple levels and may encompass more than just a widget.

The measure development process differs at each utility, and requires the coordination and input across multiple business functions. A recent study²¹ on utility measure development looked at the measure development processes at the four IOUs, plus LADWP and SMUD. It showed that these processes were highly idiosyncratic to each utility, and involved staff in engineering, product management, program management, analytics and forecasting, strategy, evaluation, marketing and communications, large customer account management, vendor alliance management, and processing operations. Across the utilities in the study, different teams play different roles, at different decision points. For example, the evaluators found that PG&E has six gates in their stage-gate process for measure development, while SDG&E has three.

The ETP is but one contributor to this process, which applies both residential and non-residential measures. Across these teams, each utility must effectively determine the technology's estimated market potential, whether the supply chain is in place, whether a vendor network can support installation and service, which customer segments might have a higher propensity to purchase and install, what level of penetration is required for the measure to become cost effective, what the market barriers might be for each customer segment, and how to design a program to overcome those market barriers. While ETP can and has contributed much of this information in the course of its activities, neither the sole responsibility nor the sole credit for emerging technology adoption belongs to ETP. ETP staff do not make the ultimate decision whether a technology is offered as a measure through a resource program.

7.3 Innovation and measure evolution often starts at the local level

The measure development process itself is not a linear process, but in many utilities nationwide, particularly those without a separate emerging technology assessment division, new technologies for the non-residential sectors are first installed through calculated projects at a local site. As more customers include the technology as a measure in incentive projects, the program administrator can use market interest as an indicator that it may be more efficient to deem the savings from the technology, rather than requiring a custom calculation for each

²¹ [Evergreen Economics, 2015](http://tinyurl.com/hs8nfgg), available at: <http://tinyurl.com/hs8nfgg>

project²². Technologies can also be deemed as measures without first going through the proving grounds of calculated projects, but a greater degree of review is needed to determine the level of market risk.

ETP also plays a critical role in custom projects, which are often the first point of entry for a technology into the measure development process. ETP's assessments are regularly shared with utility business account executives who offer custom measure options to large non-residential customers that can deliver deep energy savings due to the high energy usage of those customers.

The phases of measure evolution from calculated to deemed is important because it mirrors the different phases of innovation and technology maturity and drives the overall ETP approach presented in this Business Plan. The (now closed) U. S. Office of Technology Assessment's book "Innovation and Commercialization of Emerging Technology"²³ and shows that in the early stages of a technology's lifecycle, products are diverse, often including custom designs²⁴. During the growth phase, one product design emerges as being stable enough to have significant production volume. During the maturity phase, there are multiple product manufacturers and products have become similar enough that parts are standardized and warranties are inherent to its value proposition. Finally, in the introductory phases of a technology, a manufacturer's competitive strength comes from being able to deliver a reliable, functional product.

Overall, as the technology matures, the emphasis shifts from reliability concerns to economizing on production costs to offering the same functionality at a lower cost. Throughout the stages of technology maturity, the overall trend is from customized to standardized product designs, trading off between intensive use of resources at a distributed level to an intensive use of resources at a centralized level, realizing gains from economies of scale.

Similarly, measures also have a lifecycle. Measure evolution also progresses through these phases, and reflect similar characteristics. A new technology can become a measure as soon as a customer proposes and a custom incentive application is approved with calculated savings that meet an energy reduction need. An example of this evolution is LED parking lot lighting that first began as a custom measure and later evolved into a deemed measure. Over time, certain measures will prove to be more popular with customers. At this point, the utility program administrator may consider reducing the costs associated with implementing the measure²⁵ and begin to explore whether the measure should be deemed instead.²⁶

The design of the Statewide ETP program incorporates the natural progress of technologies and measures from customized to standardized (i.e., deemed), from localized to centralized (i.e., statewide mid-stream deem measure offer), and from standalone technologies to integrated solutions. This natural progression not only requires that high levels of emerging technologies

²² Custom measures are not available for single family residential customers.

²³ U.S. Congress, Office of Technology Assessment, Innovation and Commercialization of Emerging Technology, OTA-BP-ITC-165 (Washington, DC: U.S. Government Printing Office, September 1995). Available at <http://ota.fas.org/reports/9539.pdf> .

²⁴ This table is a synthesis of William J. Abernathy and James M Utterback's, "Patterns of Industrial Innovation, " Technology Review, June/July 1978

²⁵ Note that these costs are not just borne by the utility, as customers must also spend a lot of resources and time developing and receiving approval for custom projects.

²⁶ As a measure evolves further and gains even greater customer interest, the measure may be considered for code, or for upstream and midstream programs.

expertise be available at the local and statewide program levels, but also that the task of scanning and screening new technologies and ideas be distributed through as wide a network of emerging technology professionals as possible. The design of the SW ETP leverages the entire network that has been built by ETP subject matter experts throughout ETP's almost two decades of operation.

Workforce Education & Training Sub- sector

Draft

October 18, 2016



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Introduction - Workforce Education & Training

The Workforce Education and Training Program (WE&T) was established to support individual energy efficiency programs within each California investor-owned utilities (IOUs) program portfolios which, in turn, support State's energy efficiency goals. WE&T is a cross-cutting energy efficiency sector that impacts all customer sectors and is delivered by each of the four IOUs in their respective territories. WE&T is structured to enable practical and effective implementation of energy efficiency-related education and training activities. All the IOUs have a similar WE&T program structure, with the flexibility of customizing offerings and services to meet the unique needs of customers within the IOU service territory. The WE&T Business Plan chapter identifies a clear vision, purpose, and objectives while establishing how it will operate in conjunction with other energy efficiency programs.

WE&T was established to support the State's Energy Efficiency goals, the California Long Term Energy Efficiency Strategic Plan (CLTEESP), and the individual IOUs' programs. While there have been several decisions and studies that direct and define the scope of WE&T's work since the CLTEESP was originally issued in 2008, the CLTEESP remains a primary policy and regulatory foundation of WE&T.

The CLTEESP vision for California's overall workforce education and training effort is, "By 2020, California's workforce is trained and fully engaged to provide the human capital necessary to achieve California's economic energy efficiency and demand-side management potential."¹ The CLTEESP did not anticipate that the IOU WE&T programs would manage this major transformation alone, but rather that WE&T would work together with a wide range of agencies and organizations to achieve this vision. "It is not the core mission of utilities to effectuate the level of change needed to create a comprehensive WE&T program, nor can ratepayers fully fund the effort."² Instead, it envisioned that the IOUs would serve "as a catalyst to action by sponsoring several foundational activities...to review their existing programs and better align them within the context of a comprehensive WE&T strategy."³

The Joint IOU WE&T team began a process of developing a strategic plan that has been used to inform the Business Plan process. Each IOU participated in a series of facilitated work and data review sessions to identify needs as well as develop a vision, set of core values, goals, and strategies. During the process, several larger meetings were held with other internal staff from the IOUs to provide additional input and engagement. Two stakeholder forums were also held during which ideas and concepts were introduced and discussed with these external audiences and resulted in a framework document provided below.

Comparison to Prior Program Cycles

Historically, WE&T has been structured as three Sub-Programs— WE&T Centergies, Connections, and Planning.

WE&T Centergies

Currently, the four IOUs provide a range of education and training offerings at their Energy Centers and off-site locations throughout the state. These offerings include classes, technical outreach and

¹ CPUC, *CLTEESP*, Section 9, p. 74.

² *Ibid.*, p. 75.

³ *Ibid.*, p. 76.

education, technical consultations, tool lending libraries, and demonstration tours. The seven IOU energy centers are located in the San Francisco Bay Area, Los Angeles area, San Diego, and the Central Valley.

WE&T Connections

The Connections Sub-program focuses on K-12 and post-secondary institutions. WE&T Connections is designed to raise awareness about energy efficiency in the K-12 sector, and increase access and understanding about green career opportunities and educational pathways into green careers. The target audience for WE&T Connections includes K-12 students and teachers, community college students, and adult learners.

WE&T Planning

The Planning Sub-program has mainly encompassed activities specific to WE&T as called out in support of the CLTEESP.

Proposed

WE&T will be restructured to more accurately reflect actual activities and to ensure that the program offerings are aligned, coordinated, and effective. The current WE&T Planning will be integrated into the Centergies Sub-Program, to be renamed as the Integrated Energy Education & Training (IEET) Program. The Connections Sub-program, renamed as Career Connections, will become a statewide program under the statewide implementation approach. The emphasis and focus of these two sub-programs will be complementary while reducing redundancy and gaps.

In addition to the sub-programs and statewide program described above, WE&T has proposed a downstream program model, referred to as Career & Workforce Readiness (CWR). The new program would have a primary focus on removing barriers or disadvantages to participating in energy efficiency opportunities.

CWR will provide its primary target audience with energy education and workforce development resources through collaborations with organizations that serve disadvantaged workers and communities, such as workforce investment boards, community-based organizations, and workforce development agencies. CWR will build on the IOUs' energy efficiency expertise as energy efficiency subject matter experts and trainers, and pair with the expertise of organizations that serve disadvantaged workers and disadvantaged communities through services including case management, job placement, and soft skills training. Ultimately, the goal of CWR is to bring awareness to disadvantaged communities of energy education pathways in California, and to them provide relevant energy training.

Table 1 below describes the proposed WE&T sub- and statewide programs and the relation to each other.

Table 1: WE&T Program and Sub-programs

	Career Connections	Career & Workforce Readiness	Energy Education Training	
Primary Audience	For people unaware of energy jobs and careers: - K-12 students - K-12 instructors - Energy Job/Career seekers - Energy Education seekers	For people not prepared to enter a traditional energy job/career higher education path: - Disadvantaged communities - Disadvantaged workers	For people on a chosen educational track toward a job/career: - Post-secondary students - Adults - Retraining for those who have identified an energy career path	For people in a job/career seeking energy-focused upskilling: - Engineering & design professionals - Technical trades / journeymen
General Offerings and Purpose	- Career awareness - Teaching materials development and support (green energy/ sustainability)	- Career prep/job readiness (via partnerships)	- Track-specific technical education and training - Support for teaching materials development - Train-the-Trainer - “Kick-Start / early stage” initiatives support	- High-level and in-depth training - Targeted offerings for specific occupations - Certification program support
Primary Partnering Organizations	- K-12 schools - WIBs, CBOs	- Workforce Investment Boards - Community-based organizations - Job-training organizations	- Community and 4-year Colleges - Job-training organizations - Vocational Schools - Labor/Unions - Trade Associations - Apprenticeship & Pre-apprenticeship - Community-based organizations	- University Extension Programs - Certification agencies & programs - Professional and Trade Associations and Agencies
Outcomes	Knowledge gain, using gained knowledge and skills on the job, expanding/enhancing other organizations’ curricula. Combined outcomes will support EE portfolio goal achievement.			

The Joint IOU WE&T team considered and evaluated input and data from a broad number of sources to help identify the most critical issues and needs. Sources included:

- Evaluation, measurement, and verification (EM&V) studies
- Don Vial Center Needs Assessment and Guidance Plan
- Labor market and energy efficiency industry trends and data
- National best practices research
- Legislative, regulatory and policy decisions, including AB 758, AB 802, and SB 350
- California Energy Efficiency Coordinating Committee Input
- Statewide Stakeholder Forum Input

The analysis of this data and input uncovered a range of issues expressed as important to the future of the WE&T program, and considered in the formation of this plan. The primary issues include:

- Establishing clear roles and responsibilities for the Joint IOU WE&T program, focusing on strengths, technical capabilities, and available resources;
- Managing the magnitude, breadth, and depth of audiences that require training and education;
- Integrating other energy-related solutions such as demand response, distributed energy resources, and other non-energy efficiency training and education programs to achieve State goals;
- Increasing coordination and engagement with resource strategies and other utility offerings;
- Improving delivery of offerings to the right people at the right time in the right way;
- Expanding access and reach to energy efficiency training and education statewide;
- Identifying and analyzing pertinent and relevant data to inform, improve, and guide offerings; and
- Establishing meaningful and valuable metrics, and measurement tools.

There are five interrelated strategic goals that work in conjunction to achieve the overarching need for a more integrative, adaptable, and responsive workforce education and training sub-sector. The Plan Framework encompasses the following important themes for WE&T:

- Collaborations and partnerships are critical to WE&T;
- Engagement with internal and external stakeholders must be part of an ongoing and continuous improvement process;
- Better data, better analysis and better measurement is essential to create relevant and valuable training and education offerings; and
- The quantity of training and education is secondary to ensuring that the right information is delivered to the right people, in the right way.

WE&T is a cross-cutting sub-sector that impacts every Business Plan sector, and is delivered by each of the four IOUs. Joint WE&T is structured to enable efficient and effective interpretation and implementation of statewide direction, policies, and needs, assisting individual IOUs focus on regional customization.

The Joint IOU WE&T team envisions the WE&T cross-cutting sub-sector as an overarching structure that can coordinate program activities, enhance offerings, achieve greater reach and access for education, and train both statewide and regionally through collaborative implementation.

The WE&T Team has articulated a Strategic Framework to focus its effort to address key issues and market barriers. The five goals to guide future initiatives and resource allocation are:

1. Implement joint IOU WE&T initiatives locally to support State's goals
2. Target value-added collaborations with stakeholders and other education and training providers statewide
3. Establish a comprehensive engagement and feedback process to ensure delivery of the right services to the right audience through the right channels
4. Improve and expand access and reach, build awareness, and make it easier to participate in WE&T programs

- 5. Ensure that Joint WE&T efforts are managed and implemented to be efficient, adaptable, and accountable

A. Market Characterization

1. Customer landscape

The Statewide WE&T program addresses two major audience types: customers and their agents/employees and those who influence and serve customers.

Customers	Market Actors
Customers and in-house staff/decision makers - building owners/homeowners - facility managers - CEOs/business owners - developers	Market actors who influence and serve customers - designers - architects - contractors - builders - engineers - educators - future market actors (like students)

Each of the audience segments have different needs and requirements depending on the sector they are engaged in: residential – single family, residential – multifamily, commercial, industrial or agriculture. The WE&T program offerings provide these customers educational and outreach opportunities as well as hands-on engagement to support achievement of energy efficiency.

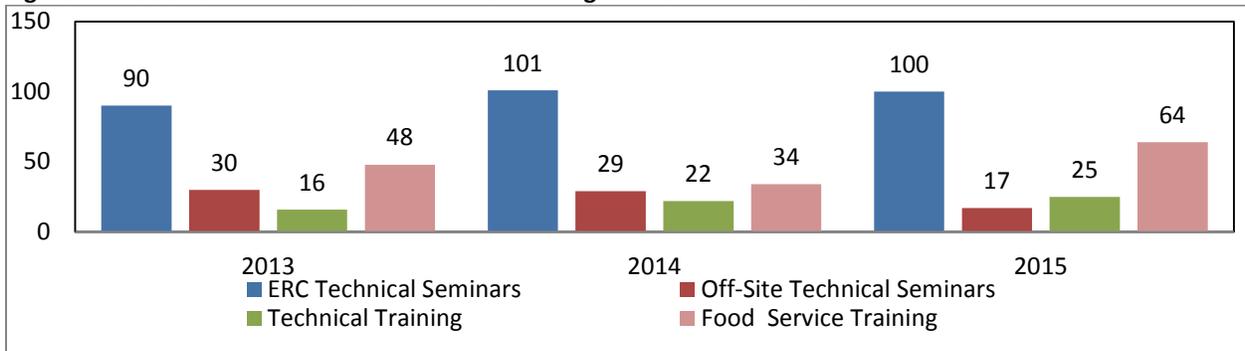
SoCalGas class participants have identified themselves as representing between 200-250 cities, primarily concentrated in Los Angeles, Orange, Riverside and San Bernardino counties, the portions of the service area where the majority of SoCalGas customers are located.⁴ Data from 2015 ERC class demographics demonstrate that participants from low-income or high unemployment areas had lower participation rates in ERC training classes. The results suggest an opportunity to improve reach and/or access to these specific populations.

SoCalGas’ WE&T staff establishes annual targets for classes that are appropriate to meeting statewide program objectives, cross-cutting portfolio responsibilities, and customer needs. There is also flexibility to modify the calendar in response to new market demands, policy decisions, and market data requiring new program strategies. This has approach has allowed the SoCalGas WE&T team to achieve high attendance for classes at the Energy Resource Center (ERC), averaging more than 55 attendees per class.⁵ SoCalGas classes have remained effectively consistent over the last few years, as illustrated in Figure A.1.

⁴ SoCalGas Event Business Management System Database

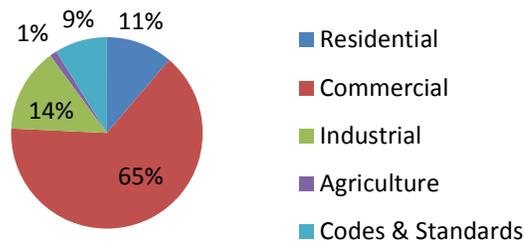
⁵ SoCalGas Event Business Management System Database (2013-2015)

Figure A.1: SoCalGas Workforce Education & Training – 2013-2015 Classes⁶



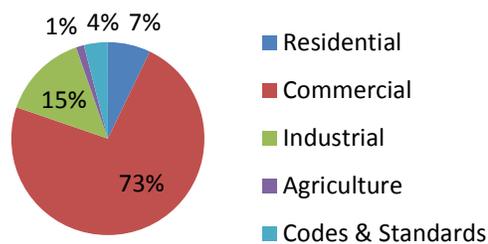
WE&T has historically offered training classes attended by participants from all market sectors, as reflected in Figure A.2, with the majority of the classes offered in support of the commercial sector customer.

Figure A.2: 2015 SoCalGas Education & Training classes by Sector⁷



The total attendance of classes, by sector, is provided in Figure A.3. It demonstrates that the attendee distribution aligns with the distribution of classes offered by segment - a result of SoCalGas WE&T staff monitoring past attendance, current customer demand, and emerging industry and market trends.

Figure A.3: 2015 SoCalGas Education & Training Attendance by Sector⁸



In a study of WE&T program participants, 29% identified themselves as owners or partial-owners while 26% of the participants identified as managers or supervisors (Figure A.4). A look at SoCalGas

⁶ SoCalGas Event Business Management System Database

⁷ SoCalGas Event Business Management System Database

⁸ SoCalGas Event Business Management System Database

participants in Figure A.5 shows that only 6% designated themselves as owners in evaluation data for training received in 2015.⁹

Figure A.4: SW Participant Role in Company

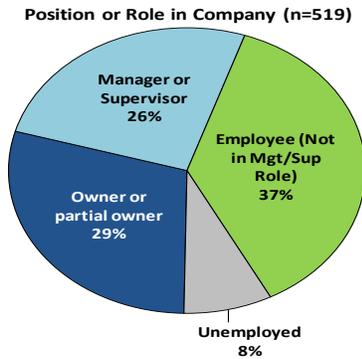
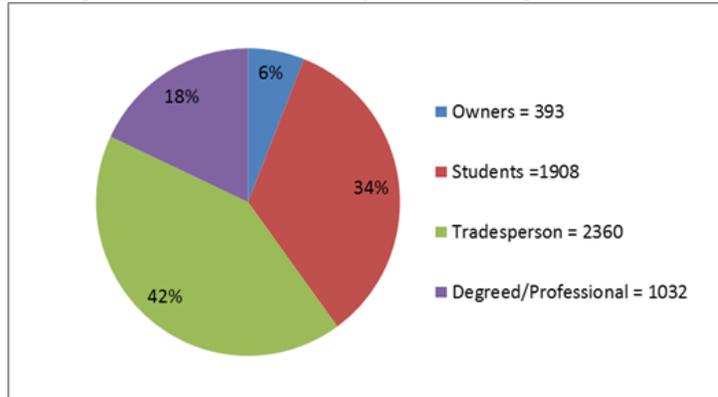
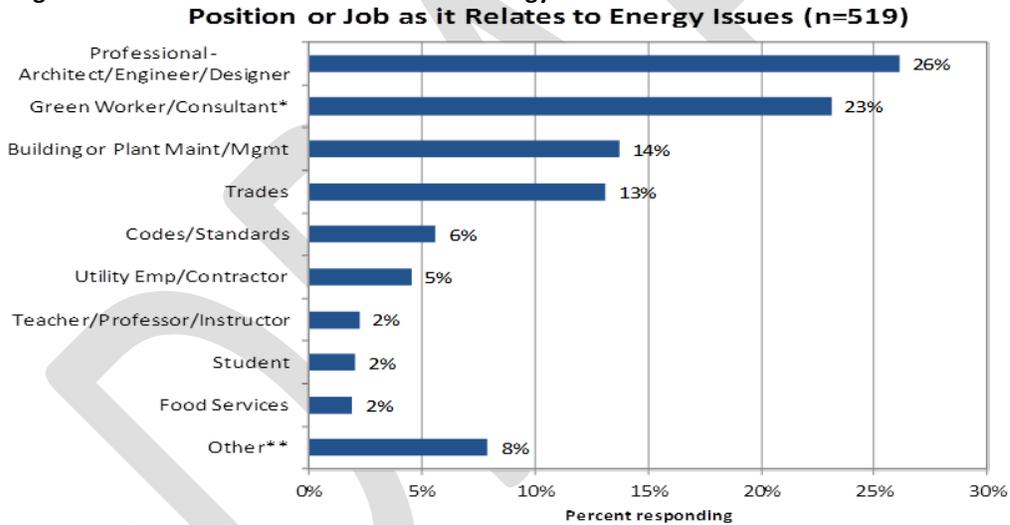


Figure A.5: SoCalGas Participant Role Designation



The statewide program primarily reached professional/white-collar workers, employed workers, and those in management, supervisory, or owner positions, while only 13% of respondents represent the trade segment.¹⁰

Figure A.7: Position or Job as it Relates to Energy Issues



*"Green Worker/Consultant" category includes energy auditor (for commercial or food industry), energy efficiency consultant or manager, energy manager, environmental preservation, HERS Rater/inspector, Home Performance auditor, low-income weatherization contractor, solar consultant or technician, sustainability consultant, and commissioning agent.
 **"Other" category includes real estate, research, manufacturing or automation worker, and business/management/marketing consultant.

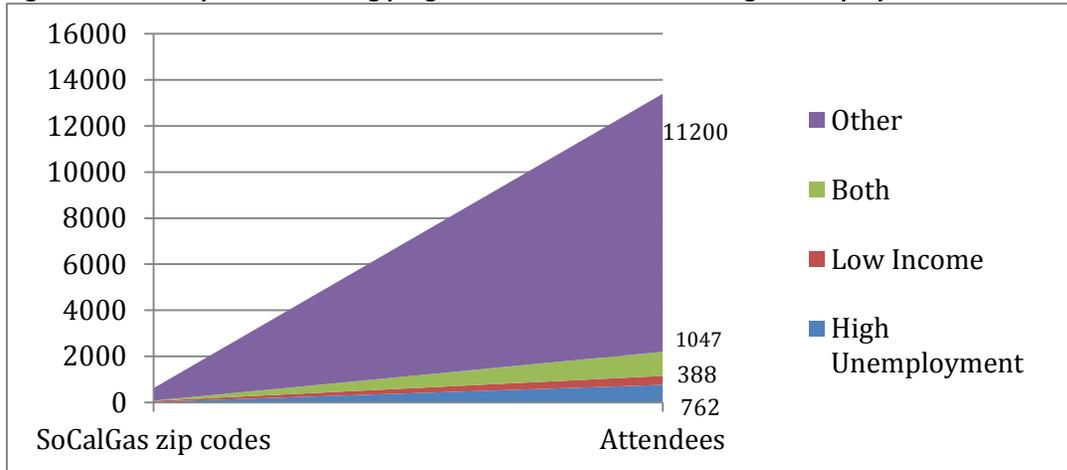
The number of participants from low-income or high unemployment areas attending SoCalGas training in 2015 was analyzed. The results (Figure A.8) reflect low participation and an opportunity to improve reach and/or access to these specific populations.¹¹

⁹ Source: Opinion Dynamics, "2013-2014 Statewide WE&T Program: Program Theory and Logic Model Update"

¹⁰ Sources: 2010-2012 WE&T Process Evaluation & SoCalGas Event Business Management System Database

¹¹ Source: 2010-12 WE&T Process Evaluation

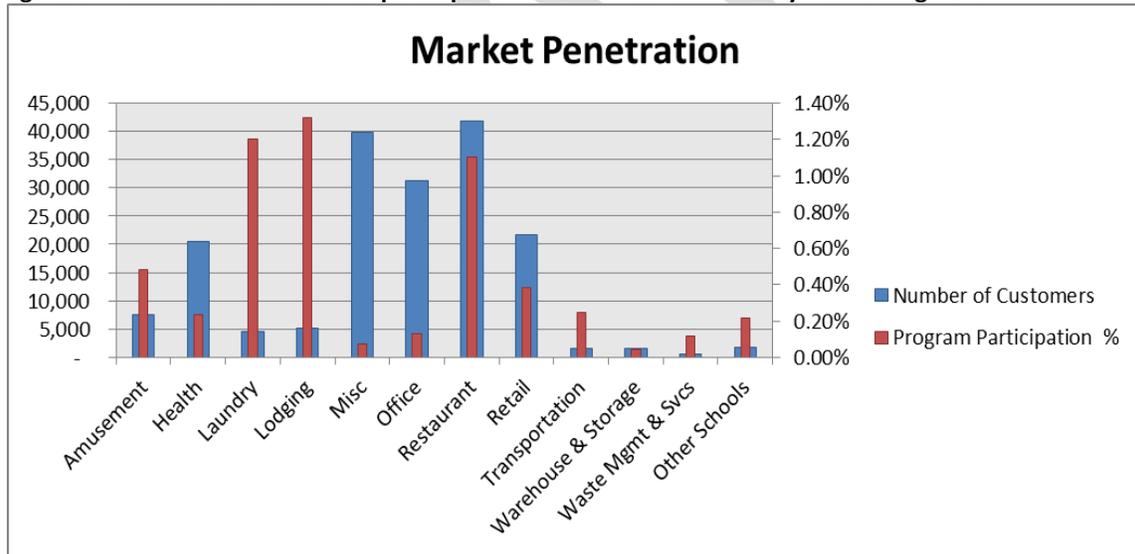
Figure A.8: Participants in training programs from low-income or high unemployment areas



Source: SoCalGas Event Business Management System Database

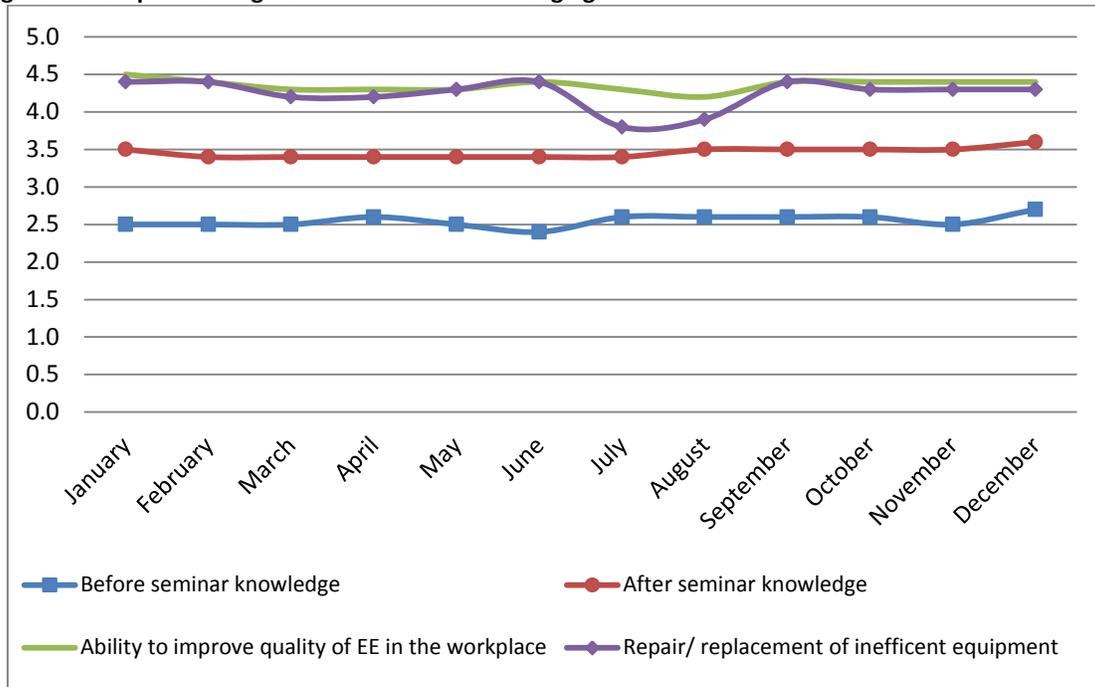
Underserved Commercial markets with high potential and low participation are geographically spread across the service area. They need influencing with specialized education to understand available EE opportunities.

Figure C.7: Commercial Customer participation and number accounts by market segment



SoCalGas-specific feedback averaged across a sampling of 2015 evaluations shows a solid increase in knowledge among attendees and strong correlation with those engaged in EE projects.

Figure C.8 Graph showing before and after knowledge gain



Source: SoCalGas Event Post Evaluation Data

2. Trends

The energy efficiency landscape is evolving in a rapid manner in California as goals that are more aggressive and new approaches for meeting those goals are pursued. At the state and regulatory levels, new concepts are being deliberated and addressed that will impact WE&T implementation and program delivery, as well as define its role as a cross-cutting program.

In brief, some of the evolving changes include:

- New Residential Zero Net Energy (ZNE) Action Plan
- New Residential building ZNE by 2020
- New Commercial building ZNE by 2030
- All Major Renovations of Existing Commercial Buildings ZNE by 2030
- Low Income Programs Proceeding
- Water-Energy Nexus Proceeding
- Codes & Standards emphasis on training for building departments

The following are a few of the major legislation that impact WE&T. Other efforts oriented to benchmarking and market transformation, among others, will likely be adopted in some form, impacting how and what WE&T should focus on in the coming years.

SB 350 – Clean Energy

Doubling of Energy Efficiency by 2030: requires the California Energy Commission to establish annual targets to achieve a doubling of statewide energy efficiency savings in electricity and natural gas final end uses

Overall cost-effectiveness and feasibility language required to establish target.

	Requires the CPUC to expand and enhance EE programs to assist in reaching deeper EE targets.
AB 758 – Implementing the Existing Buildings Action Plan – High-Performance Workforce, Education, and Training (S3.3)	Train contractors and other market actors to sell energy efficiency. Integrate customer acquisition, the provision of financing options, and other marketing activities into industry business models.
	Support the development and employment of a high performance industry for every level of professional involved in energy efficiency transactions.
AB 802 – Benchmarking & Data	Authorizes IOUs to provide incentives for energy efficiency measures to bring existing buildings up to Title 24’s energy efficiency code.
	Allows IOUs to provide customer incentives to make improvements to commercial and residential buildings to bring them up to existing energy efficiency building codes. This was previously prohibited by the CPUC.
	Challenging Residential and Small Commercial Sectors (difficult to reach and be cost effective)

In addition to legislative drivers, there are other trends that will require WE&T to be agile and flexible to respond to the dynamic environment and be innovative in the future. The following are list of key trends and actions by key market actors:

- There is a strong movement towards collaborative, digital, and online learning as well as interest-driven content.
- WE&T participants indicate they receive education and training elsewhere, including conferences, universities, community colleges and trade/tech schools, and online courses, but no one source stood out.¹²
- The Task Force on Workforce, Job Creation, and a Strong Economy identified that while more funds are needed for Career Technical Education (CTE) programs, colleges must make sure that existing resources are deployed to the most valuable programs.¹³ In public and private sector organizations, discontinuing low-value activities can be as difficult as initiating high-value activities. The same is true for community college offerings and those within the CTE domain in particular.
- The California Community Colleges Task Force on Workforce, Job Creation, and a Strong Economy has offered recommendations to the community colleges to overcome barriers affecting technical education at the community college level.¹⁴
- The number of California Partnership Academies (CPAs) available to high school student, particularly the ‘Utilities and Energy’ academies, has fallen since 2010. The sources of funds for CPA development have dwindled with most provided in 2015 from Proposition 98 and SB 1070 sources.
- The IOUs’ approach to WE&T does not address the scale of training needed to meet the CLTEESP goal of a qualified workforce by 2020. Extrapolating data from a 2014 workforce study, 9,000 new EE workers are needed every year.¹⁵

¹² 2010-2012 WE&T Program Process Evaluation

¹³ <http://www.cde.ca.gov/ci/gs/hs/cpareport09.asp>

¹⁴ Overcoming Market Barriers CCC Taskforce, pp. 11-12

¹⁵ Email from Jim Caldwell to WE&T Taskforce, “Community College Perspective on IOU Business Plans,” April 1, 2016.

- WE&T stakeholders have stated that the many offerings among education and training providers are vast and often subtly different. Consistency on technical skills and market requirements around building, equipment, and design practices is desired.
- SoCalGas courses from 2013 to 2015 were about 3-to-1 on-site versus off-site. Attendance at on-site versus off-site classes was 6-to-1, suggesting a need to increase engagement with customers off-site.
- In student evaluations on WE&T training, instructor knowledge is rated highest and technical difficulty of the course is rated lowest.¹⁶ This could facilitate course adaptation less technical end-users.
- “Builders reported that many subcontractors and builders of code-compliant homes do not have the knowledge needed to execute advanced building practices successfully. Building officials reported challenges in the code compliance process, both with homes built to code and those built above code.”¹⁷

3. Gaps/Barriers

The magnitude, breadth, and depth of audiences that require training and education to meet State energy goals creates a substantial and overarching challenge. In overcoming the challenge, WE&T is only one part of the solution focused exclusively on energy efficiency. In order to have long-term impacts, WE&T cannot do this alone.

Several gaps highlighted by the Joint WE&T IOUs, have been identified as priorities to address:

1. Routine communication and interaction on resource program achievements
2. Alignment on impacting energy demand
3. Ready and strategic collaborators to extend reach and access
4. Measuring relevancy and value of classes to students and customers
5. Use of training to fulfill the program’s objectives
6. Clearly defined role and scope of the WE&T program
7. Metrics that best measure impact on achieving desired outcomes

There are other issues that limit the effectiveness of the individual IOU WE&T efforts in meeting program goals. In the SoCalGas territory, the following barriers have been identified:

1. Operational policy and performance priorities among education and training providers make it difficult to align on energy efficiency
2. Education/training materials need to be adaptable for expanded reach and accessibility for use by broader audiences

B. Value

1. Roles for cross-cutting sector

While not a resource program or accountable for direct impact on energy savings, the WE&T Program is well positioned in its role as a facilitator of skills training and workforce standards needed to perform the type, level, and quality of work needed to promote energy efficiency. The target audience of the trainings range from single-family residential customers all the way through large industrial decision-

¹⁶ Opinion Dynamics, 2010-2012 WE&T Process Evaluation, 2012.

¹⁷ Residential ZNE Market Characterization, CALMAC Study ID PGE0351.01, February 2015.

makers, making WE&T a critical element in providing cross-cutting sector support. This is further supported by the intentions of the California Long-Term Energy Efficiency Strategic Plan (CLTEESP), one of the primary policy and regulatory foundations of WE&T. The CLTEESP refers to the role of WE&T as part of the strategic solution. As the EE portfolio transitions to the sector-based approach, being an element of a strategic solution requires that WE&T be incorporated across all five of the main customer sectors as well as be in alignment with the other cross-cutting sectors.

2. How does it support portfolio

WE&T support sectors in reaching critical high-potential customers in the most effective manner with field applicable training and end-user appropriate education. WE&T also works to develop relationships with key partners to support the vision of the WE&T programs as well as the SoCalGas portfolio. These partners include: training providers, trade associations, K-12 and post-secondary educational institutions, industry, government agencies, unions, community based organizations (CBOs), and local, regional and state governments.

3. How does it benefit customers

Each of the IOU WE&T Programs offer a common sub-program structure, while each IOU provides distinct offerings and services that cater to the unique requirements of their broader portfolio and service territory. The WE&T program serves customers with a coordinated statewide program, implemented regionally for IOU-specific and statewide goals achievement.

As a component of the SoCalGas EE Portfolio, WE&T implements training and educational solutions that deliver consistently to meet statewide policy, industry, and workforce demands. As such, WE&T also provides customer education, outreach, and hands-on engagement across various audience types, including:

- Workforce (professionals, tradespersons, employed/unemployed)
- Industry group members
- Educational Institutions (public post-secondary, vocational, and adult education)
- End-users (business owners as well as building and property owners)
- Public Service personnel.

4. External impacts and benefits

Historically, the program has been a non-resource program that promotes energy efficiency to a variety of customer segments and trade allies. The Energy Centers, while continuing their traditional activities and goals, are much more cognizant of ally relations in order to:

- Facilitate and contribute to worker certification;
- Reach audiences that are deemed disadvantaged and/or underserved;
- Increase connects with the trades and professions on seminars and training; and
- Increase the number of market actors and skill levels in the green workforce.

C. Vision

SoCalGas' WE&T vision is: Be an innovative statewide advisor and leader of workforce education and training to help meet the State's energy efficiency goals, leverage the collective strength of the four IOUs, become more effective, and activate a strategic network of partners.

MISSION To facilitate, support and provide subject matter expertise for the transfer of energy efficiency knowledge and skills to the industry across all sectors, balancing the needs of the State, customers and our communities.

VISION Be an innovative statewide advisor and leader of workforce education and training to help meet the State's energy efficiency goals, leverage the collective strength of the four IOUs, become more effective, and activate a strategic network of partners.

VALUES

Customer & Market Driven

Technical & Operational Excellence

Collaborative

Accessible

Innovative

Integrative

GOALS

Goal 1. Statewide Initiatives: Create statewide WE&T initiatives to support State's goals and implement regionally.

Goal 2. Collaborations: Target value-added collaborations with other education and training providers and statewide stakeholders.

Goal 3. Engagement & Feedback Process: Establish a comprehensive internal and external engagement and feedback process to ensure WE&T provides the right services to the right audience through the right channels.

Goal 4. Access & Reach: Improve and expand access and reach, build awareness and make it easier to participate in WE&T programs.

Goal 5. Efficient, Adaptable & Accountable: Ensure that Statewide WE&T efforts are managed and implemented to be efficient, adaptable, and accountable.

OBJECTIVES

WE&T programs are aligned to State needs and goals and provide a consistent framework for the four IOUs.

The network of collaborators will complement, focus, and/or expand WE&T's reach and depth of Energy Efficiency concepts and activities with key audiences.

Stakeholders will be actively engaged and part of a process of continuous improvement and feedback.

Key audiences participation, depth of knowledge, and satisfaction increases.

Targeted market and customer data analysis and project management leads to supporting energy savings.

1. Discussion of opportunities

WE&T Program

The SoCalGas WE&T Program, in helping to build skills needed in the workforce offers series and/or certification classes to increase skills and knowledge; offers expanded certifications and/or continuing education unit (CEU) credit classes formed from joint relationships; and increases participation in WE&T training by disadvantaged workers initiated from strategic collaboration.¹⁸

In its role, WE&T will develop and maintain a broad-based network “map” of potential collaborators and education providers that contains pre-requisite qualifications and capabilities about providers. It will be used as a guide for filling market gaps in training infrastructure and/or resource program intervention.

WE&T opportunities often depend on various requirements determined by both the markets to be served and governing regulations. Figure C.2 depicts a model and type of criteria or considerations needing to be quickly assessed for determining how, what, and who to consider when seeking a strategic collaboration.

Figure C.2: Sample “Opportunity” model for consideration in selecting strategic collaborators



¹⁸ WE&T Program Theory Logic Model – PTLM

Opportunities

In the coming years, there are several opportunities to promote energy efficiency by the WE&T program including:

- The California Community Colleges Task Force on Workforce, Job Creation, and a Strong Economy made recommendations to the California Community Colleges to overcome barriers effecting technical education at the community college level.¹⁹ The recommendations include: creating common workforce metrics for all state funded CTE programs; revising the curriculum development process to ensure alignment from education to employment; and improving the CTE student progress and outcomes.
- Collaboration is necessary in order to impact new entrants and most of the 220,000 incumbent workforce needing upgraded skills for the green economy.²⁰
- The Green Jobs Handbook contains an Apprenticeship pathway model that illustrates an example of a successful and well-established Career pathway map.²¹
- Work with impacted sectors on new and complex concepts intended as transformational to the market, such as ZNE, and moving toward consistent agreement on a common concept, definition, and application.
- Expand collaborations between SoCalGas WE&T and local trade and industry affiliates, as well as promote seamless linkage between program strategies to showcase pathway relationships and options to audiences.
- A common definition of what the green economy entails or what makes a job green does not seem to exist. In numerous reports published on the subject, the definitions can vary widely, primarily due to differences in the purpose and scope of the studies.
- Implement unique delivery methods to engage critical customers from across the sectors with education and extended training resources to attract and potentially generate participation in EE programs and projects.
- Develop data-driven marketing strategy and complementary campaign approach to target key audiences.
- Enhance WE&T presence via social media and mobile applications, and adapt curriculum for these platforms for convenient customer access to education and training materials.
- Consider the learnings from the current Workforce Conditions study when determining how to best collect demographic information from Energy Savings Assistance (ESA) contractors or other program contractors in the future.²²

Opportunities: Sectors

Coordinate with all sectors, to provide training and introduce critical EE concepts to key market actors in a segment for their help in ushering transformation among targeted constituents. Such collaboration could resolve ambiguity experienced from general “one-size-fits-all” programs. Instead, SoCalGas will assist sector segments with solutions that complement segment business priorities as well as education

¹⁹ Overcoming Market Barriers CCC Taskforce, pp. 11-12.

²⁰ Email from Jim Caldwell to WE&T Taskforce, “Community College Perspective on IOU Business Plans,” April 1, 2016.

²¹ Environment Defense Fund, Green Jobs Handbook, p. 54.

²² CPUC Workforce Conditions Data Report Final 06-30-2015, pp. 9-10,

and training intervention to sustain commitment.²³ The following are list of sector-specific opportunities for the WE&T offering:

- SoCalGas WE&T reaches a large segment of market actors serving the Commercial market, but fewer end-user decision-makers, underserved, and geographically spread Commercial customers.²⁴ Many segments of the Commercial sector require specialized services, offer high-energy savings potential and show low participation rates in EE.
- Contractors serving the Residential sector indicate a need for training to address increasingly new opportunities arising in the multi-family markets, such as mixed-use property equipment infrastructure.
- For Industrial underserved accounts, cost-effective incentive based offerings are difficult to identify, creating a potential need similar to that in the Public Sector - training content that can be applied on a small scale.
- Multifamily owners and operators need training, specifically, how Building Operator Certification (BOC) training²⁵ may help contractors engaged in programs involving multifamily buildings.²⁶
- Industrial sector customers could benefit from education and training to address the varied and complex EE opportunities.

2. Whether items are near-, mid-, long-term strategic initiatives

[See, Metrics, Appendix A]

D. Metrics

A summary of the WE&T metrics is shown in Appendix A.

E. Program/PA coordination

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and collaborative, on-going relationship among all implementers and program administrators. The WE&T team is well integrated and works cohesively as a statewide team. The development of a WE&T strategic plan and Stakeholder Engagement Forum have strengthened the working relationships with the other utilities and other external stakeholders. The WE&T team should continue to leverage the Stakeholder Engagement Forum as a means to foster an open and transparent environment that encourages dialogue and fosters innovation.

At the local level, it would be beneficial to develop and maintain relationships with businesses and building management, content and curriculum design, community-based workforce development agencies, secondary and post-secondary education institutions, labor and apprenticeship groups,

²³ "ACEEE Executive Summary, Overcoming Market Barriers and Using Market Forces to Advance Energy Efficiency", March 2013.

²⁴ Energy Efficiency Policy Manual Version 4.0, August 2008, p. 50.

²⁵ Building Operator Certification is a national training program developed and operated by the Northwest Energy Efficiency Council that provides technical training on equipment maintenance and operating practices that optimize system performance and efficiency.

²⁶ Multifamily Process Evaluation for 2014-15

industry and labor-specific member groups, private and other public agencies, local governments, and local chamber agencies.

F. EM&V Considerations

Analysis of prior EM&V studies and response to recommendations

{Pending}

Anticipated study needs

{Pending}

Internal performance analysis/feed-through during program deployment

{Pending}

DRAFT

Appendix A: Metrics

Energy Efficiency Business Plans: Sector Metric Table - WET Program

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
Operational policy and performance priorities among education and training providers make it difficult to align on energy efficiency	WE&T curriculum and implementation supports California's educational and training network on the goal of doubling EE savings by 2030.	1. California's educational systems incorporates energy efficiency as part of the training and education curricula	<ul style="list-style-type: none"> - Collaborate with education and training providers to expand and enhance the energy efficiency content of their curriculum. - Provide EE education opportunities along an educational pathway for students and the EE workforce that includes career awareness, core energy education and career enhancement and technical upskill. 	Number of trained trainers / students reached	2015 Participation Levels	Program tracking data	Increase the number of trained trainers by 5% over 2015 levels by year 3	Increase the number of trained trainers by 10% over 2015 levels by year 7	Increase the number of trained trainers by 15% over 2015 levels by year 10

Energy Efficiency Business Plans: Sector Metric Table - WET Program

Problem Statement	10-year Vision	Desired Outcome	Intervention Strategies	Sector Metric	Baseline	Metric Source	Short Term Target (1-3 years)	Mid Term Target (4-7 years)	Long Term Targets (8-10+ years)
Education / training content needs to be adapted for expanded reach and accessibility for use by broader category	WE&T curriculum and implementation support IOU Sectors on the goal of doubling EE savings by 2030.	2. Variations of adapted Energy Center education and training materials are accessible to key audiences for specific application.	<ul style="list-style-type: none"> - Expand reach of Energy Center training courses, curriculum and related materials Align WE&T offerings to support/shape the energy efficiency market based on EE potential data and emerging trends 	Increased number of trainees reached	2015 Participation Levels	Program tracking data	Increase number of trainees by 5% over 2015 levels by year 3	Increase number of trainees by 10% over 2015 levels by year 7	Increase number of trainees by 20% over 2015 levels by year 10

Finance Sub-sector

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A  Sempra Energy utility

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A. Market Characterization

a. Customer Landscape

As the nation's largest natural gas distribution utility, SoCalGas delivers clean, safe and reliable energy to 21.6 million consumers through 5.9 million meters in more than 500 communities. SoCalGas' service territory encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from Visalia to the Mexican border. SoCalGas customer profiles include residential, commercial, public, industrial, and agricultural customers of all sizes. This chapter focuses on the New Finance Offerings (i.e., the new Pilots approved in D. 13-09-044) and the infrastructure being developed to implement them. Other finance offerings, like On-Bill Financing (OBF), are noted here, but are discussed in more detail within the relevant Business Plan Chapter.

The following are key characteristics of the energy efficiency (EE) financing market:

Nonresidential Customers

- **Commercial and Industrial Customers lack understanding of financing options.** Small and medium commercial and industrial customers lack the resources to study and research financing options available to them.
- **Public sector customers' adoption of EE financing products varies.** Public sector customers especially in the local government segment, have different legal perspectives on whether EE financing products, such as OBF, are considered an increase in debt for the local government.
- **Customer adoption of OBF continues to grow.** OBF continues to attract participation among all sectors, especially the public sector.

Homeowner

- **EE Finance customer is primarily a single-family homeowner.** Residential single-family is typically defined as buildings that contain no more than four units. There are approximately 8.8 million homes in California under this definition.¹ Multi-family unit buildings are treated as nonresidential properties.
- **Three common types of EE financing products.** The following are the primary financing products available to homeowners: (1) *home equity loans*, (2) *term loans* (i.e., term loans from financial institutions that can be either secured or unsecured against equipment), and (3) *Property Assessed Clean Energy (PACE) loans*.
- **The PACE program is by far the most popular among potential customers.** PACE represents 90% of that volume, or \$196 million, while EE term loans represent 8%, and energy efficiency home equity loans represent 2%.
- **One in six homeowners consider making EE upgrades.** Among homeowners who did not complete any energy related upgrade in the past two years, one in six homeowners (16%) considered making an energy-related upgrades but did not, primarily due to the high upfront costs of the upgrades.

¹ U.S. Census Bureau, October 2011.

- **About 25% of customers finance home improvements.** About one-third of homeowners completed energy-related upgrades in the last two years, but only a small fraction of them (one-quarter) used any type of financing².
- **Significant opportunity for financing to assist “willing” customers.** The opportunity for financing to help fund and grow energy-related projects in the near future is significant. Four in ten homeowners said that they are likely to make an energy-related upgrade in the next two years, and 27% are at least somewhat likely to use financing, which is similar to the portion of homeowners who reported using financing for energy-related upgrades in the past two years (25%).

Home Contractor

- **There are approximately 55,000 contractors qualified to work on residential properties.** These contractors hold an active General Contractor (Class B) and/or HVAC (Class C-20) licenses in California and perform work on residential properties. Most of these contractors are aware of EE financing products available to their customers, but few are aware that contractors can promote and offer directly to their customers.
- **Contractor size and marketing capacity indicate support for EE financing products.** Of the contractors who do promote financing to their customers, the vast majority are medium and large sized contractors likely because they have better developed sales and marketing capacities. The large contractors are also three times more likely than small contractors to offer solar PV equipment financing, which may contribute to their higher rates of financing promotion.
- **More contractors promote PACE than any other EE financing product.** One in ten contractors are promoting PACE financing. Amongst the few contractors promoting any type of EE financing, the majority of them are promoting PACE. PACE appears to dominate amongst contractors.
- **Perceived lack of capacity among contractors to promote financing.** Contractors reported that that they had limited capacity to promote financing.
- **Lack of awareness of financing options available.** Some contractors indicate that they are not sufficiently aware of financing options available (38%).
- **Some contractors are not interested in promoting financing.** One in seven contractors indicate that they are not interested in promoting financing to their customers, largely because they do not believe they should be involved in how a customer chooses to fund projects.

b. Trends

Key trends in the financing market within California include:

- **About 25% of customers finance home improvements.** As noted previously, roughly one-third of homeowners completed energy-related upgrades in the last two years, but only a quarter of them used any type of financing³. Amongst the 36% of homeowners who purchased an energy-related upgrade in 2012-2013, the vast majority (75%) did not use any form of external financing. Only 25% of customers used external financing at all and even fewer (20%) used conventional financing.

² PY 2014 Finance Residential Market Baseline Study, Volume I of II, Opinion Dynamics, p. 1.

³ PY 2014 Finance Residential Market Baseline Study, Volume I of II, Opinion Dynamics, p. 1.

- **PACE loans dominate residential EE loan market.** PACE financing dominates energy efficient financing volume, so far. In 2014, customers borrowed \$218 million in energy efficient financing. PACE represents 90% of that volume, or \$196 million, while energy efficiency term loans represent 8% and energy efficiency home equity loans represent 2%. However, the homeowner survey results suggest that the conventional financing market for energy-related upgrades is likely four times greater than the 2014 Energy Efficiency Financing Program (EEFP) loan volume⁴ resulting in an estimated \$850M-\$1B of energy-related upgrades being supported by conventional financing in 2014.
- **Contractors complete EE program applications on behalf of the customer.** Several contractors reported that they offer utility rebates to their customers, and most of these contractors complete the paperwork and submit it on the customer's behalf. If the financing program and the rebate programs are coordinated such that participating in the financing program can result in faster rebate processing, this may be a very attractive feature to contractors.
- **Very low customer interest in EE-specific term loans.** The volume of EE-specific term loans is low compared to the volume of PACE lending, accounting for only 8% of EEFP lending volume. Moreover, the vast majority of EE-specific term loans is delivered by credit unions, with banks generally doing very little with this type of product. Customers typically used conventional financing rather than energy efficiency-specific financing. Among survey respondents who used financing for energy-related upgrades to their home, 81% used conventional financing options that have no energy efficiency requirements. These most often included credit cards and bank loans. In comparison, 14% used energy efficient financing options like PACE or energy efficient terms loans.
- **EE home equity loans are rarely used to fund EE improvements.** Home equity loans account for only 2% of EEFP loans. EE equity loans have not gained much traction in the market in comparison to PACE and term loans, despite the large number of financial institutions registered with the Federal Housing Administration (FHA) to offer PowerSaver and Energy Efficient Mortgage (EEM) loans. This indicates that the market opportunity for these loans is limited (perhaps due to qualification criteria), the loans lack sufficient marketing support, or the current design characteristics of these loans are not attractive to customers.
- **Growth in EE-related financing products.** Financing EE upgrades is not necessarily new as homeowners have, for many years, financed home renovations, including EE measures, through conventional term loans and home equity loans, or short term lending through credit cards. However, only in the last five years have financing products developed specifically to encourage homeowners to invest in energy efficiency.

c. Gaps/Barriers

There are several market barriers present within the same market that inhibit the customer from achieving higher levels of energy efficiency. Market barriers are a byproduct of the market sector characteristics and the customer's behavior within that specific market sector. Program strategies are temporary interventions introduced into the market sector to reduce these market barriers to create real, lasting market changes.

⁴ Reference?

The following are perceived market barriers identified during the business planning process. Specific examples related to each market barrier are provided.

Market Barrier: High first cost

- **High costs associated with more comprehensive EE projects.** The combination of financing and rebates appeared to be more effective than either method alone in both the residential and nonresidential sectors.
- **Interest rates are too high.** About two-thirds of the homeowners (62%) felt that the interest rates available to them through the market are too high. This percentage increases for low-income homeowners (72%) and for low-FICO-score customers (69% with FICO below 640). About 41% of customers feel that it would be difficult to obtain a loan. These barriers are larger among customers with low income or low credit scores.
- **Shorter loan tenors create low participation.** Increases in loan tenors (e.g., 24 to 48 months) can improve an EE project payback thereby creating more demand for EE financing products in the nonresidential sector.

Market Barrier: Hassle factor

- **Financing offering can be complicated and overwhelming to residential customers.** Western Riverside Council of Governments sponsored HERO primarily to achieve economic goals. Such goals appear to carry fewer policy requirements than conservation goals, and the absence of ratepayer or significant taxpayer subsidies avoids the need for extensive regulatory oversight on spending or program outcomes. As a result, HERO has been able to offer a simple application process and minimal restrictions on eligible measures, which have been key factors in its growth. In contrast, when the Sonoma County Energy Independence Program (SCEIP) PACE program sought to enforce a policy-driven project loading order, requiring efficiency measures before renewables, participation dropped sharply.⁵
- **Complicated loan processes reduce participation in the nonresidential sector.** Similar to the residential sector, a need for very simple, streamlined financing processes is necessary to promote greater participation among “willing” customers.

Market Barrier: Asymmetric Information

- **Lack of contractor support at point of sale.** As demonstrated by the three PACE programs, administered by third parties and most active in California (HERO, California FIRST, and Ygrene), the key to driving participation in a financing program is to meet the needs of contractors. All three programs have dedicated significant resources to providing an easy and reliable tool that can help contractors grow their businesses.⁶
- **Lack of consistent definition for “energy efficient upgrades”.** The requirements and definitions for what qualifies as “energy efficient upgrades” are not consistent among financing products. Many financing products that specifically fund energy efficiency do not have strict requirements or standards for energy efficiency. Some products may use

⁵ Id, p. 7.

⁶ Id, p. 6.

very liberal definitions of what constitutes energy efficiency and some may have more conservative definitions. How strictly the products define what qualifies as energy efficiency will likely have an impact on the outcomes from various products.

- **Financial institutions are not positioned to promote EE financing.** The point-of-sale-financing origination model has the potential to drive business compared to bank originated financing, regardless of which offer lower interest rates: Financial institutions are not necessarily in a position to sell EE financing successfully, instead it is the contractors who perceive EEPs as a useful tool to sell home improvement projects that facilitate the lending. In many big-ticket industries (e.g., automobiles) financing is often marketed and originated at the point of sale. Since contractors are selling the energy efficiency upgrades to customers, this channel has great potential to introduce and originate financing if needed.

B. Value

a. Discussion of roles for cross-cutting sector

In response to California's goal to double energy efficiency levels by 2030, the Finance offering will promote greater levels of adoption for more comprehensive EE solutions for customers. The EE Finance offerings will consist of a variety of financing options for single-family and multi-family residential customers as well as for small business and broader nonresidential customers. These new financing offerings will support all types of demand-side investments, including energy efficiency, demand response, distributed generation, and storage.

b. How does it support portfolio

EE Finance will be seamlessly integrated with other energy efficiency programs to provide customers with comprehensive EE solutions in a simple, easy approach that will enable greater levels of customer participation throughout the program portfolio. Customers will be eligible to receive financing as well as program rebates or go through the finance-only path.

Overall, the new EE Finance offerings are designed to:

- Encourage customers to invest in projects that will achieve deeper energy savings;
- Overcome the "first cost" barrier of energy efficiency upgrades;
- Leverage ratepayer funds by bringing in private capital to improve on the overall program portfolio cost effectiveness;
- Increase sales and installation of energy efficient products and services; and
- Reach a broader set of customer groups (e.g., disadvantaged communities, historically low EE adoption rates) and market segments.

c. How does it benefit customers

EE Finance offerings are designed to facilitate the adoption of energy efficiency by addressing one of the major barriers to participation – up-front costs. Additionally, EE Finance enables customers to take a holistic approach to projects and acts as a catalyst to implement improvements regardless of

capital improvement budgets or schedule constraints. The offerings are designed to help customers produce deeper energy savings.

C. Vision

The Energy Efficiency Finance vision and corresponding key objectives set the tone and direction for the next generation of EE finance offerings. It is vitally important that they are clear, concise and connected to California's overall energy efficiency vision. The finance business plan relies, in part, on the current California Long Term Energy Efficiency Plan as a touchstone to help shape its vision, but more importantly, the development work that went into issuing Commission decision D. 13-09-044, which set the foundation for the current platform to administer the new Pilots. The business plan has other influences including: Commission policies, legislative directives, evaluation studies, industry trends, customer needs, stakeholder input and program experience.

The Energy Efficiency Finance objectives were borne from the energy efficiency business planning efforts and reflect the areas of focus needed to achieve the its vision. The key objectives are provided to set clear and tangible direction. Over time, the vision and/or the corresponding objectives may be reset to adapt to changes in the financing industry, contractor community, regulatory policies, laws, and customer response to program offerings.

Finance: Vision

Customer adoption of deep, comprehensive energy efficient-related solutions for their homes and businesses through innovative and affordable financing options promoted by the contractor community and supported by the financial industry.

Key Objectives:

Near-term

- Create program participation processes that are easy for contractors to integrate into their sales process and business operations, achieving the following: port seamlessly into their proposals; offer customers a compelling proposition; accept a broad array of eligible measures; approve the majority of customers; confirm approval quickly while the contractor is "at the kitchen table"; support fast and easy closings; and pay the contractor promptly.
- Create simple, streamlined program processes for the nonresidential sectors to promote ease of entry into the program.
- Coordinate EE financing programs with EE incentive programs to support immediate rebates to facilitate the contractor point of sale with customer.
- Coordinate implementation of the "finance-only" path being developed for the new Pilots.
- Reduce the interest rates and/or other key loan terms relative to other non-EE focused financing products.
- Create education and outreach partnerships with lenders focused on financing whole building, whole solutions and major EE equipment installations.
- Launch new finance offerings and convert successful programs into long term programs for customers that do not qualify for OBF, or where OBF can be leveraged to do more.
- Emphasize contractor training and marketing outreach.

- Offer affordable EE lending options for low- and moderate-income and poor creditworthy borrowers.

Long-term

- Help contractors to encourage customers to finance EE equipment. Create and support a new database that includes project and financial product performance.
- Create offerings that will appeal to customer groups that have low participation in EE financing programs. For example, customers who: desire loans under \$5,000; want to financing non-eligible EE measures; have little to no home equity; and prefer not place a lien on homeowner's property.
- Transition to private lending to support all loans currently funded by EE ratepayers.
- Rely on qualified contractor community to exclusively promote EE financing products during the point of sale with customer.

D. Program Strategies and Delivery

a. On-Bill Financing

On-Bill Financing (OBF) offers interest-free, unsecured, on-the-utility-bill loans that work in conjunction with utility energy efficiency programs. It is designed primarily to facilitate the purchase and installation of qualified energy efficiency measures by non-residential customers who may lack up-front capital to invest in real and sustainable long-term energy cost reductions. Loan terms range from up to five years for commercial customers and up to ten years for government agency customers. The eligible loan amount is based on the project cost, less incentives or rebates, up to the loan maximum of the OBF product and within the loan term thresholds. Customer loans are repaid through a fixed monthly installment on their utility bills. There is no prepayment penalty and loans are not transferable. Additionally, partial or non-payment of loans could result in shut-off of utility service.

Implementation barriers for natural gas-only OBF continue to be the long payback periods for natural gas equipment. Project payback periods for most gas projects tend to be much longer than the five year maximum required for business projects to qualify. Customers and contractors will be encouraged to seek out deeper retrofits that will meet the program requirements.

b. Finance Pilots

The lack of financing to overcome the first cost barrier continues to be a central challenge to implement energy efficiency improvements. Many existing financial products were not created to encourage energy efficiency improvements and thus not effective or attractive for consumers to invest in energy efficiency.

With the use of ratepayer supported credit enhancements and IOU on-bill repayment, the CPUC has authorized the IOUs to launch new financing pilots in an effort to broaden market eligibility and participation with enhanced financing options for energy efficiency improvements for ratepayers and lenders. The financing pilots are intended to leverage private capital from third party lenders to expand

the access of attractive financing through innovative financing programs. Key pilot design elements include:

- On-Bill Repayment (OBR): Allows customers to repay third party energy loans and leases on the utility bill.
- Credit enhancements: Minimize risk of capital losses for third party lenders, thereby resulting in increased consumer access to enhanced financing terms

In September 2013, the CPUC approved D.13-09-044 to implement statewide residential and non-residential finance pilot programs to address the first cost barrier to support energy efficiency improvement projects. These pilots are intended to serve multiple segments including single family, multifamily, small business, and other non-residential sectors.

As part of the implementation of the financing pilots, D.13-09-044 established the California Hub for Energy Efficiency Financing (CHEEF). The CHEEF's role includes coordinating among various market participants and managing funds and data. In July 2014, the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) received legislative authority to administer the pilots as the CHEEF manager. To assist with program implementation, CAEATFA awarded the Master Servicer (MS) contract to Concord Servicing in April 2015. Each pilot is expected to run for 24-months starting from the time the first loan is enrolled in the program.

Goals and Objectives

Goals of the finance pilots include the following:

- Attract private capital to support energy efficiency investments by leveraging the additional security created through use of the utility bill as well as ratepayer-supported credit enhancements.
- Improve interest rates and other terms under which financial institutions offer energy efficiency financing to customers.
- Enable customers to undertake larger and more in-depth EE projects.
- Expand successful pilots and features as full programs.

Table 1 provides a list of the program types with a brief description. The Residential Energy Efficiency Loan Assistance Program (REEL) launched in the third quarter of 2016. The IOUs and CAEATFA will focus on the launch of the remaining pilots, including the OBR feature.

Table 1: Financing Pilots

Program Type	Description
Residential Energy Efficiency Loan (REEL)	Single family residential loan program without on-bill repayment feature.
Energy Efficiency Line Item Charge (EFLIC)	On-bill repayment sub-program of REEL (PG&E only).
Master-metered Multifamily	Available for property owners of affordable housing buildings with 20 or more units with on-bill repayment feature.
Small Business Loan	On-bill loan program for small businesses as defined by the United States Small Business Administration (SBA).
Small Business Lease	On-bill and off-bill lease program for small business as defined by SBA.
Non-residential without Credit Enhancement	On-bill repayment program for all non-residential customers. Distributed generation is allowed.

E. Program/PA Coordination:

A key to successful program administration is having an open, positive collaboration among program implementers and other program administrators. SoCalGas is committed to a coordinated and collaborative, on-going relationship among all implementers and program administrators.

The financing pilots will be implemented the same statewide in the four IOU service territories. As of 2013, SoCalGas has been the statewide lead assisting with the coordination of efforts with CAEATFA, the IOUs and the other PA’s ranging from regulatory compliance to information technology (IT) data exchange protocols/system integration testing. The pilots are expected to run through at least the fourth quarter of 2019.

F. EM&V Considerations:

The EE Finance crosscutting activities support all customer sectors with very unique and divergent ways they use energy. There is a need for a deeper level of research on each of customer sector and segments respond to EE financing solutions.

The IOUs and the CPUC will continue to research the success of current and new finance offerings in the future. The financing pilots will undergo impact and process evaluations at the appropriate time. The list below reflects ongoing, planned, and potential future studies whose results will help shape future programs.

Market Research and Process Evaluation:

- Calculating cost-effectiveness appropriately for financing programs
- Non-Residential finance market study
- Finance market, education, and outreach evaluation

Load Impact:

- On-bill financing impact evaluation
- Financing pilots impact evaluation
- Incremental savings from finance offerings