

# *Stage 2*

Draft Industrial Sector Profile and Market Problem / Solution Statements for the Rolling Portfolio Business Plans. Prepared for Stakeholder Feedback.

05/05/2016



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## Introduction

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, we deliver clean, safe, and reliable energy to 21.6 million consumers through 5.9 million meters in more than 500 communities. Our 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.

We will continue to be leaders in delivering innovative customer assistance and energy efficiency programs that are valued by our customers, sensitive to the environment, stimulate the economy, and make a difference in the communities we serve. 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 industrial sector businesses, both large and small. Our vision is to offer a suite of solutions that incorporates the best available technologies and services valued by our industrial customers, contributes to achievement of the SoCalGas energy savings goals, and that ultimately aligns with the California Long Term Energy Efficiency Strategic Plan and the State's overarching greenhouse gas (GHG) reduction policies.

As an interim step in the development of the SoCalGas comprehensive energy efficiency 10-year rolling portfolio Business Plan (the Business Plan), this document provides a high level view of the industrial sector within the SoCalGas service area in terms of energy usage, energy savings, and estimated incremental energy savings potential. This document presents problem statements that reflect the most significant obstacles to achieving our energy use reduction goals, observations, and proposed solutions that will be explored further throughout the business planning process. This document aims to solicit feedback from stakeholders; stakeholder input will be leveraged as SoCalGas develops its comprehensive Business Plan.

## Industrial Sector Market Characterization

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 Q1 2016,<sup>1</sup> and Los Angeles exhibits the lowest vacancy rates of the ten largest markets across the U.S.<sup>2</sup> Aside from economic cycles and macro

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

<sup>2</sup> "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>

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.

This section provides an overview of the industrial market in the SoCalGas service area with respect to facility size, industry type, annual energy use, energy savings, and remaining energy efficiency potential.

## Industrial Account Segmentation by Annual Usage

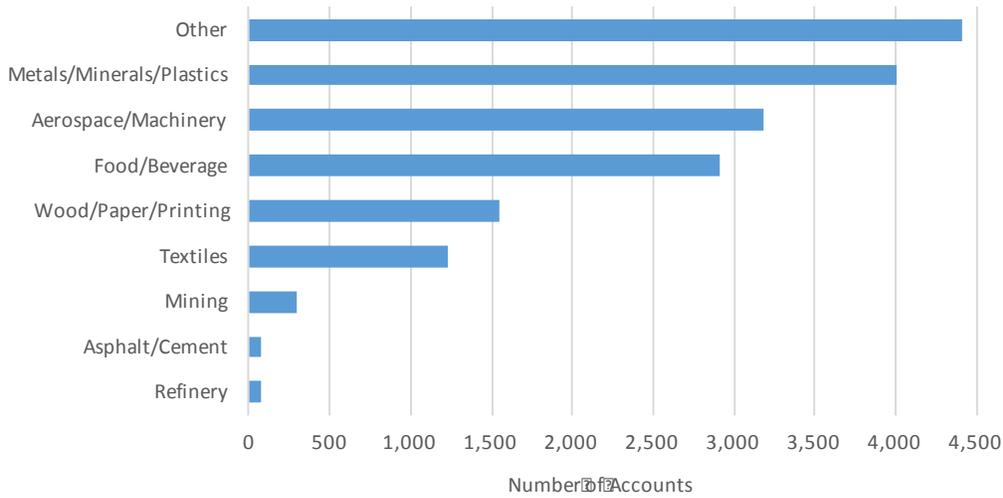
Annual natural gas usage is a key segmentation variable of the SoCalGas industrial sector. At the highest level, we divide this sector into two primary segments based on average annual gas usage. The **Medium/Large** segment includes approximately 1,400 industrial facilities that each consume greater 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.

The **Small** segment includes approximately 16,300 accounts that each consume up to 50,000 therms per year. 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 2,800 therms per year, which is below the threshold to qualify for our calculated custom incentive program. The Small segment 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 1,200 therms per year.

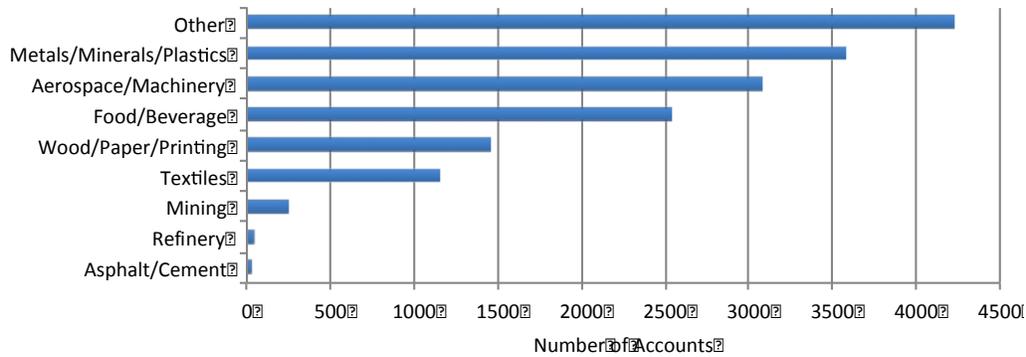
## Industrial Sector Segmentation by NAICS

SoCalGas' industrial customers are segmented into nine distinct NAICS categories. As shown in Figure 1, aside from the Other segment, Metals, Minerals, and Plastics is the most prevalent with 4,411 accounts, or 23% of our industrial accounts. Figure 2 includes only the Micro/Small segment, which exhibits a similar distribution.

**Figure 1. Industrial Segmentation by NAICS Segment (All Accounts)**



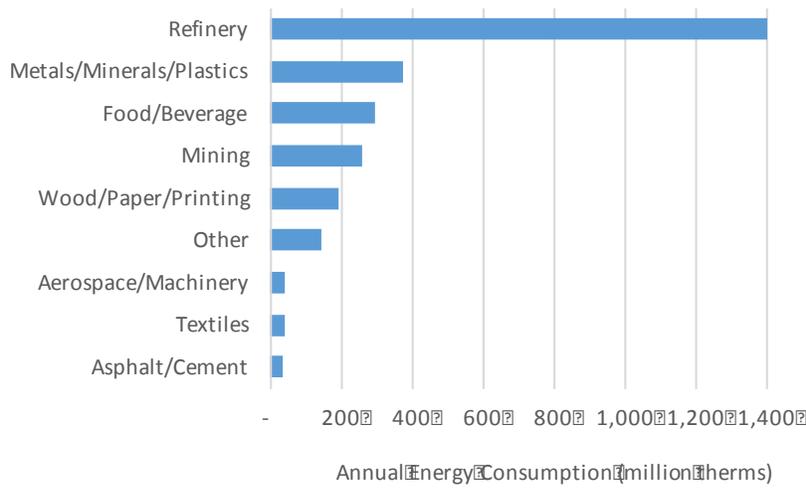
**Figure 2. Industrial Segmentation by NAICS Segment (Micro/Small Accounts only)**



## Industrial Sector Energy Usage

Between 2010 and 2015, SoCalGas industrial customers consumed a total of 4 billion therms of gas. Figure 3 shows the annual energy usage by NAICS segment. Refineries use, by far, consume the most gas per year at 1.4 billion therms, or approximately half of all of the annual natural gas usage of the industrial sector. Other segments with large usage include Metals/Minerals/Plastics, Food & Beverage, Mining, and Wood/Paper/Printing.

**Figure 3. Annual Energy Usage by NAICS Segment**



### Industrial Sector Energy Savings

The industrial sector programs (summarized on page 8) delivered approximately 36% of the SoCalGas portfolio savings. Notably, from 2013 to 2015, SoCalGas industrial customers saved a total of 74 million therms of gas, or 2% of total annual industrial gas consumption. Industrial gas savings account for approximately 29% of SoCalGas’ entire portfolio during this time period, which does not include savings attributable to mining or agriculture.

As shown in Figure 4, refineries accounted for the largest portion of industrial sector program savings—13 million therms from 2010 to 2015. Other segments that account for large portions of total savings include Food/Beverage (2.2 million therms annually) and Metals/Minerals/Plastics (1.2 million therms annually).

Figure 5 depicts annual energy savings of industrial sector by end use and by program. Approximately two-thirds (68%) of the savings are associated with process heat, followed by 19% from water heating measures. The majority of industrial energy efficiency savings results from the Custom-Calculated incentives program. The majority of savings from the Custom-Calculated Incentives and Small Industrial Facility Upgrade programs are from process heat measures, whereas most of the savings for the Deemed Incentives program are from water heating measures.

Figure 4. Annual Energy Savings and Consumption by NAICS Segment

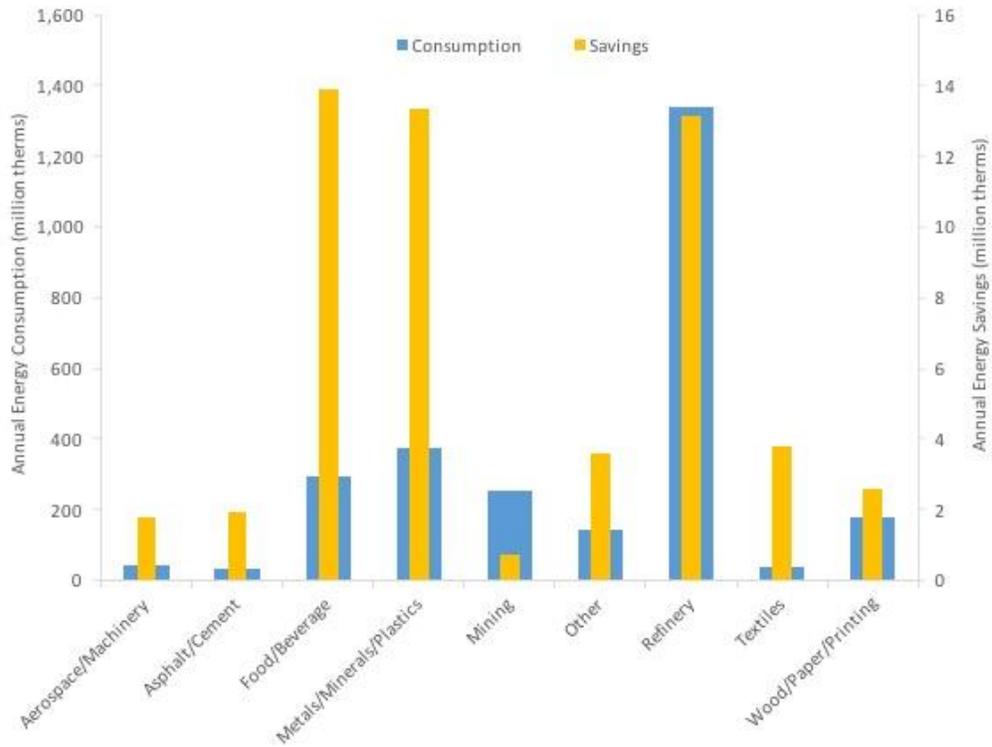
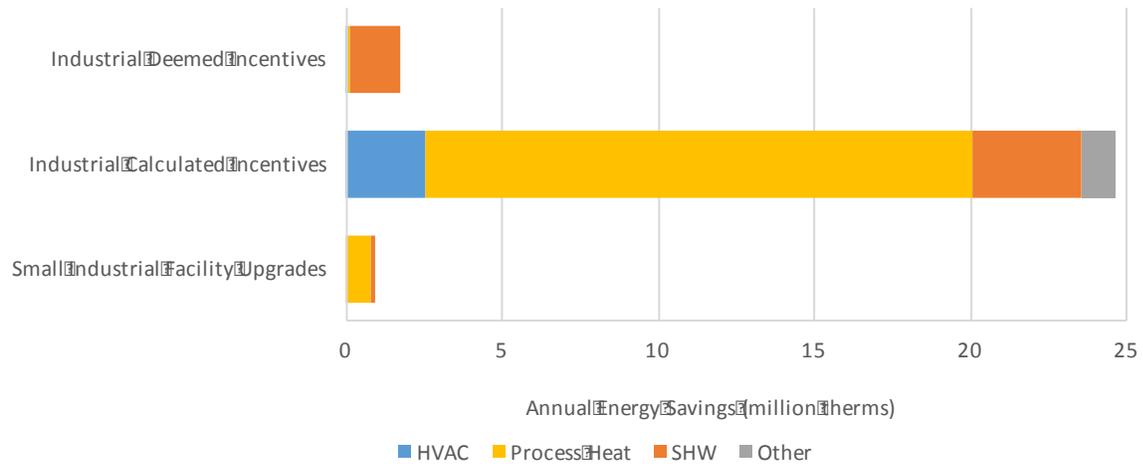


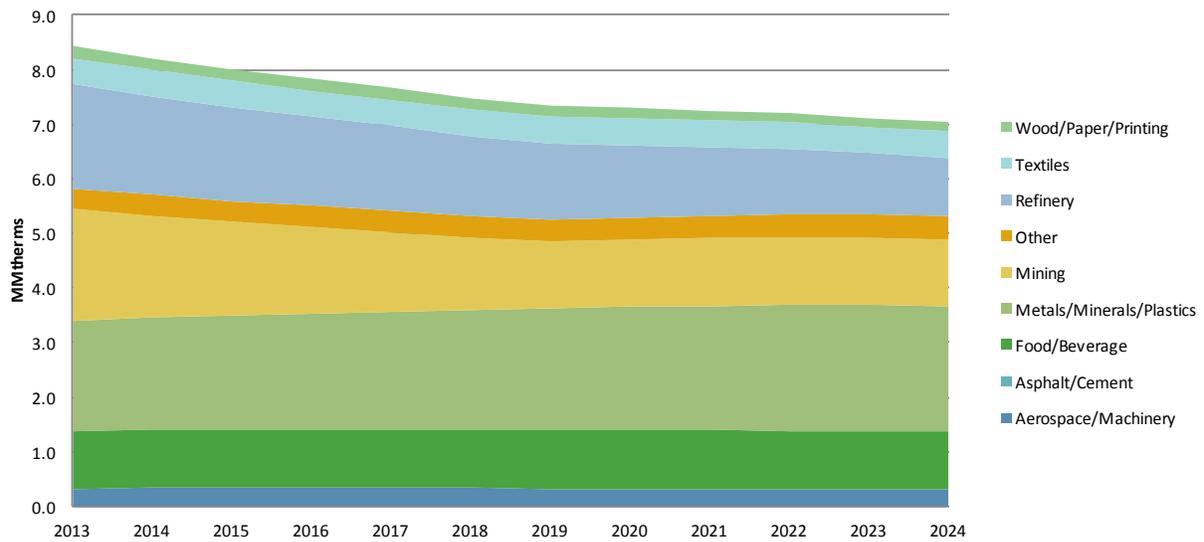
Figure 5. Annual Energy Savings by End Use and by Program



## Industrial Sector Incremental Market Potential

The SoCalGas industrial sector gap analysis (completed for phase 1) indicated that industrial energy efficiency market potential lies between 5.8 and 6.4 million therms annually from 2016 and 2024. Figure 6 shows the estimated market potential for savings through 2024, by NAICS segment. Market potential is projected to increase in the Metals/Minerals/Plastics segment. There is a steady, yet declining potential projected for the Refinery, Wood/Paper/Printing and Textile segments, and the Aerospace/Machinery and Food/Beverage segments are projected to remain steady in potential over the next decade.

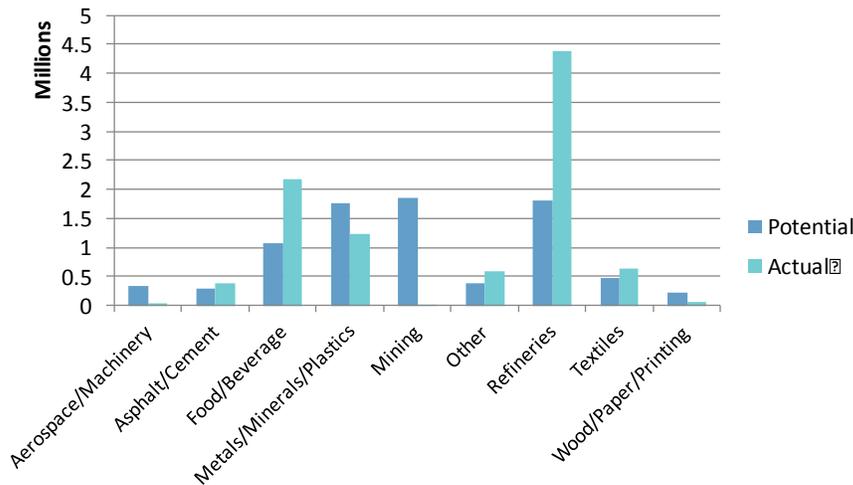
**Figure 6. Industrial Sector Market Potential, by NAICS Segment**



Source: Energy Efficiency Potential and Goals Study for 2015 and Beyond, prepared for the California Public Utilities Commission by Navigant Consulting, Inc., September 25, 2015.

Figure 7 compares estimates of energy savings potential with actual savings, by NAICS segment. As shown, actual savings are considerably higher for Refineries and are twice as large as the potential savings for the Food/Beverage segment. Many segments such as Aerospace/Machinery, Mining, and the Wood/Paper/Printing have a high potential for energy savings, but have low participation rates. SoCalGas will examine the cause of low market penetration of SoCalGas programs in specific segments; while this data might reflect significant market potential remains, it could also reflect lack of cost-effective measures or other barriers to be addressed for the potential to be realized.

Figure 7. Comparison of Potential Energy Savings and Actual Energy Savings, by NAICS segment



Source for Actual Savings: SoCalGas data.  
 Source for Potential Savings: Energy Efficiency Potential and Goals Study for 2015 and Beyond, prepared for the California Public Utilities Commission by Navigant Consulting, Inc., September 25, 2015.

## Overview of Current Program Offerings

SoCalGas offers a wide variety of general and targeted solutions for its industrial customers. Interventions range from training, audits, self-assessment and improvement strategies, third party programs, to our core incentive programs. By offering custom-calculated incentives for expansive and unique projects, these programs aim to influence Medium/Large customers, as well as Micro/Small industrial customers who may value a more prescriptive rebate approach. In addition to rebates and incentives, SoCalGas offers a suite of non-resource programs that provide technical assistance and training to our industrial customers as a value-added service to support our customers to improve their facility operations and to further encourage their participation in the resource programs.

### Resource Programs

The **Industrial Deemed Program (Rebates)** delivered 1.8 mm therms from 2013 to 2015. Rebates remain a simple and cost-efficient way for small to medium size customers to engage in our programs. The energy savings are deemed for measures installed. The program also features rebates per unit measure for installed energy-saving projects. It provides customers and equipment vendors an easy-to-use mechanism and allows SoCalGas to cost-efficiently incent and encourage adoption of mass-market energy efficiency measures through fixed incentive amounts. This offering also provides rebates to customers with a simple mechanism to offset the cost of off-the-shelf energy-saving equipment.

The **Industrial Energy Efficiency Calculated Incentive Program (EECIP, or Custom-Calculated)** is a custom offering which delivered 25.7 mm therms from 2013-2015. The program pays incentives based on calculated energy savings for measures installed as a result of comprehensive technical and design

assistance for retrofit and recommissioning projects, and integrated energy efficiency/demand response initiatives in new construction. The Custom-Calculated program offering is well received by customers in the Medium/Large segment. Historically, Medium/Large accounts have accounted for the majority of savings and exhibited the highest participation rate. Over the past few years, however, the program has included additional requirements that have resulted in a decline in customer participation. Despite recent challenges, the program continues to be the primary contributor of our energy efficiency portfolio.

A significant challenge to industrial customer participation in the EEIP program is the ex-ante review process. SoCalGas is collaborating with statewide IOUs and stakeholders to refine this process. Eligibility qualifiers such as Industry Standard Practice (ISP), Evidence of Influence, and baseline have introduced uncertainty in the market. While this is a major short-term challenge, it could also represent one of our biggest opportunities. Besides our internal continuous improvement initiatives to respond to these issues, there are opportunities that will arise from the passage of recent legislation (notably SB 350 and AB 802) as well as an invitation from Commission Staff to rebrand Continuous Energy Improvement (see below) to include behavioral and process improvement energy savings.

The **Small Industrial Facility Upgrade** is a third-party delivered program that works with the SoCalGas' customer account representatives to identify project opportunities, develop projects, and assist the customer through the Custom-Calculated application process. This program assists SoCalGas industrial customers to become more energy efficient and productive through the adoption of existing technologies, including those with low market penetration. This program offers Custom-Calculated process improvements, as well as deemed measures currently offered through the Statewide Industrial Energy Efficiency Program. The program has evolved to focus on the Medium/Large segment and has grown significantly; in 2015, this program delivered nearly 1 million therms.

Figure 8 illustrates the participation trend in our resource programs over the 2013-2015 period. As noted previously, we have observed a decline in the custom-calculated incentives program, particularly in 2015 compared to previous years. The Small Industrial Facility Upgrade program exhibited a steady increase in participation over the 2013-2015 period.

**Figure 8. Number of Projects of Resource Program Projects, 2013-2015**

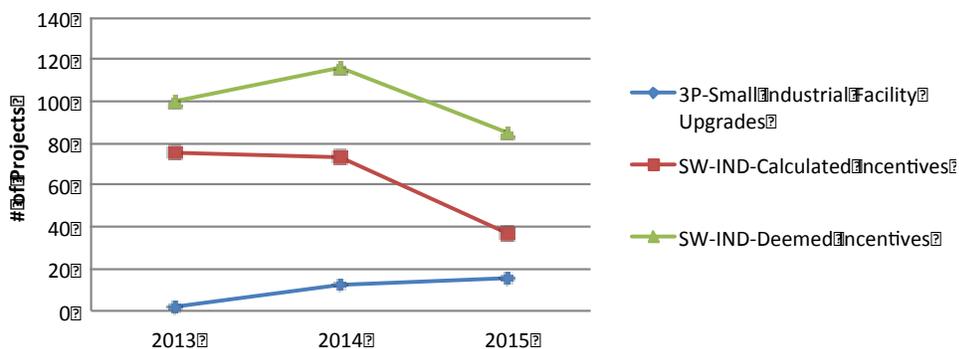
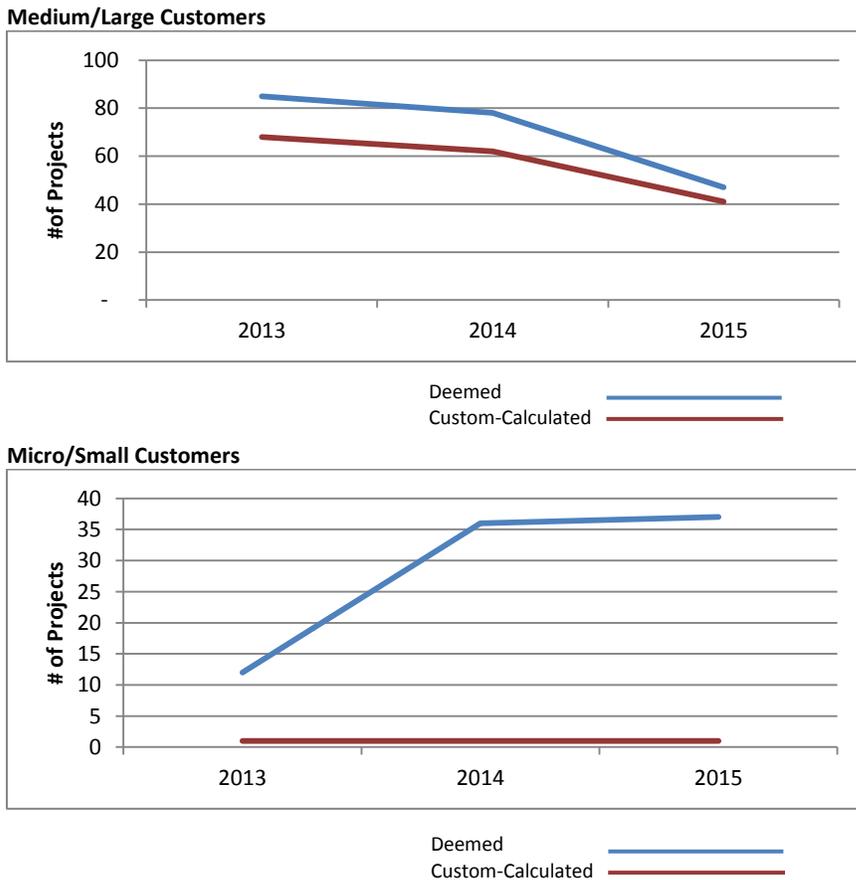


Figure 9 compares participation by the Medium/Large and Micro/Small segments in our Deemed and Custom-Calculated programs. Participation by Medium/Large customers in both programs has declined, while participation by Micro/Small customers in the Deemed program has increased since 2013. As expected, participation in the Custom-Calculated program by Micro/Small customers has been low.

**Figure 9. Number of Calculated and Deemed Projects, by Account Size, 2013-2015**



## Non-resource Programs

In addition to the resource programs summarized above, SoCalGas also administers a number of non-resource programs to support energy efficiency needs, including technical assistance, audits, and training.

One key offering is the **Continuous Energy Improvement (CEI)** program. This program entails an educational and strategic planning process that informs and trains customers to manage their facility energy costs using metrics to drive fact-based and data-driven decision making in their energy usage. The program helps customers to assess current facility operations, develop a strategic energy plan, identify opportunities, implement and monitor the plan, and then reassess.

To provide technical assistance to customers, SoCalGas offers the **Energy Advisor (EA)**, which is an audit service that can fund surveys, ASHRAE level I and ASHRAE level II audits, and is a potential “next step” for customers in their education. EA has been very successful in targeting specific sectors, such as refineries and paper. SoCalGas also provides technical assistance through facility **Benchmarking**. Benchmarking is a way for a customer to compare their facility energy use and energy efficiency with that of similar facilities nationwide. Benchmarking can also help increase energy efficiency and reduce operating costs.

**Workforce Education and Training** offers over 25 different classes for industrial end users, ranging from one-day boiler basics to a five-day Certified Energy Manager class. Nearly 1,800 customers attended at least one industrial class at SoCalGas’ Energy Resource Center in 2015. Customers who attend a class are typically introduced to other classes and product offerings appropriate to the sector.

The **Trade Professional Program** and directory helps industrial customers to connect qualified local professionals with business customers looking to buy, service, or install energy-efficient natural gas equipment. While this is not a contractor referral program, the Trade Professional Program provides our industrial customers with easy access to trade allies with specific expertise as well as working knowledge of SoCalGas’ energy efficiency program offerings and services.

The full suite of Industrial sector energy efficiency programs offered by SoCalGas has, for the most part, remained unchanged over the recent program periods (2010-2015). Various measures have been sunsetted, while others have been introduced into the offerings, as we strive to continue to provide our customers with innovative, cost-effective solutions that will ultimately improve their operations and reduce overall facility operating costs. We observed a decrease in program enrollment in the 2014-2015 period, and will seek to understand internal and external participation drivers (and barriers) and, more importantly, will develop new initiatives and program delivery mechanisms to increase market penetration.

The remainder of this document identifies what we feel are the most significant problems that we face, related observations, and potential solutions we will consider and further develop as we continue to build our Business Plan.

## **Problem Statement #1: Limited cost-effective technologies and strategies exist for the Micro/Small customer segment.**

As shown in the previous Market Characterization section, the Micro/Small customer segment represents 92% of the industrial sector accounts, but only about 2% by natural gas consumption. Thus, the potential for energy efficiency in the Micro/Small segment is relatively low. A key consideration of our Micro/Small customer base is if natural gas is used for the primary processes in the facility and to produce output. Most Micro facilities – the smallest customers in terms of annual gas consumption – use gas for hand washing, showers, and space heating for offices and production space similar to residential and commercial customers. As a result, there are a limited number of cost-effective energy efficient gas measures available for the Micro/Small industrial customers. With few energy efficiency opportunities, strategies for engaging this very small-sized customer base are limited. This has created an underserved market.

### **Key Observations**

**Diverse Customer Segment.** The Micro/Small industrial customer base is extremely diverse among many industrial segments (aerospace/machinery, food/beverage, textiles, etc.). As a result of the customer diversity, it is difficult to find common measures that are applicable across all industry segments. Moreover, the broad range of facility types makes it difficult to create a “one-size-fits-all” value proposition and marketing messages that apply to all customers. This issue of segment diversity exists to some extent across all industrial customer sizes; however, it is exacerbated by the additional numerous issues discussed below.

**Lack of Cost-effective Measures.** Few cost-effective natural gas energy efficiency measures exist for the Micro/Small industrial customer. With the exception of water heating-related energy efficiency measures, existing measures for Micro customers provide limited gas savings opportunities relative to average energy usage, thus provide small financial benefit for the customer.

**Economics Inhibit Participation.** Micro/Small customers tend not to participate in energy efficiency programs due to the limited energy savings potential as well as the complexity of the program application requirements. Energy savings associated with Custom-Calculated projects are small and do not justify time needed to pursue that path. Daniel Trombley, author of an ACEEE report on small and medium-sized manufacturers, notes that although smaller manufacturers pay higher prices for their energy, capital constraints of energy efficiency projects remain to be significant barrier.<sup>3</sup>

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<sup>3</sup> Trombley, Daniel. "One Small Step for Energy Efficiency: Targeting Small and Medium-Sized Manufacturers". ACEEE Report IE1401. January 2014.

**Lack of In-house Energy Efficiency Champions.** Micro/Small customers often do not have sufficient staff to champion or pursue energy efficiency from within their organization. Moreover, staff who manage small industrial facilities have competing operational priorities. Trombley notes that smaller facilities are generally less likely to have dedicated energy managers, staff resources, and expert information on energy efficiency opportunities than larger facilities.<sup>4</sup>

## Proposed Solutions

**Develop Small Industrial Program Track.** For Micro/Small customers, SoCalGas will explore alternate program strategies that are more appealing and provide an easier path to participation. Offerings such as no-cost energy assessments and recommendations, direct install, mid/upstream incentives, and simplified deemed incentives may prove to have greater market appeal within the Micro/Small customer segment.

**Simplify the Application Process.** For Micro/Small customers who may be interested in custom solutions, SoCalGas will seek to pilot a simplified customized incentive program application process to make participation easier and more appealing. Trombley also suggests offering workshops and informational materials to help manufacturers identify energy efficiency opportunities.<sup>5</sup>

**Expand Program Offerings.** Expanded program offerings that better align with the needs of the Micro/Small segment will be essential to increasing market penetration in this segment. Offerings include new natural gas technologies that have the highest energy efficiency potential. Encourage innovation through a coordinated focus on industrial natural gas measures as part of the statewide Emerging Technologies Program, and explore a third-party solicitation through TRIO or IDEEA365 to identify new technologies and program offerings directed at various Micro/Small industrial segments.

**Develop Targeted Outreach Strategy.** To effectively target Micro/Small segments (e.g., food service, etc.) with greatest energy efficiency potential, we will seek to leverage consumption data from AMI technology to efficiently target customers with the highest energy efficiency potential for both retrofit upgrades and behavioral changes. It will be important to develop an outreach strategy specifically designed to advise the Micro/Small customer and speak to value propositions that are unique to not only the Micro/Small facility, but also to specific NAICS segments.

**Coordinate Dual-fuel Program Offerings with Electric Utilities.** Deliver dual-fuel programs with PAs and MOUs to co-deliver and co-brand program offerings to reach more customers, improve program delivery, and expand upon the currently limited number of gas-only measures that are relevant for the Micro/Small industrial segment.

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<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

## Partners

**Program Administrators.** SoCalGas will continue to coordinate with program administrators and MOUs to improve existing and create new programs strategies to reach the Micro/Small industrial customer. We will collaborate with program administrators to the extent that program modifications are necessary to ensure we leverage all available best practices and promote statewide consistency if appropriate.

**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 directed at the Micro/Small customer group.

**Third-party Program Implementers.** By utilizing the statewide energy efficiency IDEEA365 channel, program administrators can solicit new and innovative programs from third-party program implementers to address the Micro/Small segment. Leveraging the third-party programs allows program administrators to draw upon creative program solutions that can be quickly and effectively targeted to these customers.

**Industrial Trade Organizations.** 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.

## **Problem Statement #2: The complex structure of the current program offerings for Medium/Large industrial customers is a barrier to participation.**

The current industrial energy efficiency program offerings are complicated, undervalue energy benefits, and require significant amount of customer time and effort to participate. These barriers have prevented large industrial customers from participating in energy efficiency programs.

## Observations

**Energy Usage Baselines.** Changes in the assumed energy usage baselines (e.g., ISP) over the past few years have significantly reduced the allowable savings as a result of energy efficiency investments. Recent evaluations for the statewide continuous energy improvement pilot and custom program include

recommendations to establish more robust baselines and to ensure conformance with CPUC policies.<sup>6,7</sup> Consequently, program participation has dropped in recent years, especially in the Custom-Calculated program. For example, steam trap replacement measures for industrial customers were available via the deemed program until 2009, when they were required to be moved to the custom-calculated program. Participation with that measure has dropped significantly since then, with only three industrial steam trap replacement projects in 2013-2014 and none in 2015.

**Complex and Difficult Project Applications.** Medium/Large industrial customers prefer to participate in Custom-Calculated programs to recognize all energy savings associated with unique customer operations. However, project requirements of current custom-calculated energy efficiency program offerings create an additional program barrier. The program has become more complex and time consuming with increasing documentation requirements. In general, it takes a significant customer investment in time and effort to participate in current programs. As a result, energy efficiency must compete internally for staff time and expertise.

**Behavioral Energy Savings are Not Recognized in Net Energy Efficiency Estimates.** There are several behavioral energy saving measures that require little or no capital expenditures, including operations and maintenance (O&M) improvements. However, these measures are not currently recognized as net energy efficiency measures.

## Proposed Solutions

**Conduct Customer Research.** As a first step to address this significant barrier, SoCalGas will conduct customer research with Medium/Large industrial customers to identify where program participation process can be simplified. For example, customer experience mapping can inform a redesign of the customer journey resulting in a more efficient and positive experience, especially with the Custom-Calculated incentive program.

**Simplify and Streamline Program Processes.** Using feedback gathered in customer research, SoCalGas will simplify the Custom-Calculated incentive program application process, including a pay-for-performance option based on metered energy savings. Streamline program processes and provide greater customer support to reduce the program participation barrier. Potential solutions can include a more automated application process, enhanced data tracking, and training to vendors and assigned account representatives to reduce incomplete applications. Moreover, customers can benefit from a quicker and simpler program application process that recognizes the customer's total project energy savings. These efforts will address barriers identified in the SoCalGas Non-residential Process Evaluation Study, including data management challenges and application errors.<sup>8</sup>

**Leverage Legislative/Regulatory Support for Encouraging Industrial O&M and Behavioral Savings.** SoCalGas will explore the possibility of offering a continuous improvement program that recognizes

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<sup>6</sup> 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.

<sup>7</sup> 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.

<sup>8</sup> 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.

energy savings realized from operations and maintenance (O&M), behavioral changes, and non-capital process improvements. AB 802 opens the door for applying whole-building approaches to capture savings other than from the traditional deemed measures.

**Pay-for-Performance Option Based on Metered Energy Savings.** Documenting energy savings for measures such as O&M and behavioral improvements can be difficult to quantify at the measure level because individual measures may provide only small savings compared to total facility energy use. SoCalGas will explore normalized metered energy consumption to determine the overall impact of O&M and behavior measures as an alternate approach to quantify savings. For this approach, savings would be calculated as the difference between the normalized metered energy consumption for baseline and post-intervention time periods.

Normalized metered energy consumption has been proposed as the approach to determine energy savings for the AB 802 program for commercial buildings. This approach can also be applied to industrial facilities, although it can be more challenging. For facilities with complex and highly variable operations, developing energy use models needed to normalize metered energy use and to document changes in the operations that significantly impact energy use can require a significant, iterative effort. This leads to a multi-year pay-for-performance incentive based on metered energy usage.

## Partners

**Program Administrators.** SoCalGas will continue to coordinate with other program administrators to simplify program engagement and to capture all energy efficiency benefits associated with the industrial program offerings. We will collaborate with program administrators to the extent that program modifications are necessary to ensure we leverage all available best practices and promote statewide consistency if appropriate.

**California Public Utilities Commission and Key Stakeholders.** SoCalGas will investigate ways to simplify program requirements and to identify policies that will recognize all energy efficiency benefits associated with industrial process improvements.

## Problem Statement #3: Industrial customers face organizational barriers to energy efficiency.

Industrial customers face organizational barriers to energy efficiency, including limited financial resources, many competing objectives, and strict investment payback requirements. Financial resources for energy efficiency capital expenditures are limited for industrial customers regardless of funding source (customer-funded or financial loans). Energy efficiency investments are often overshadowed by competing operational objectives.

## Key Observations:

**Lack of Access to Capital.** Access to funds for any capital expenditure is typically a hurdle for industrial customers, both large and small. As Russell and Young, researchers of industrial investment decision drivers, note, “By nature, the capital budgeting process stimulates a fierce internal competition among the departments within a business unit, since needs are almost always greater than the available funds.”<sup>9</sup> The SoCalGas Non-residential Program Process Evaluation Study identified this issue and mentions, “cross market financing programs, particularly on-bill financing (OBF)” as potential solutions.<sup>10</sup>

**Low Priority for Energy Efficiency.** Achieving the customer’s operational goals may include large capital expenditures to meet: certain payback periods, production targets, safety and regulatory compliance, and production schedules. As a result, energy efficiency is rarely a significant consideration for an industrial customer weighing a possible capital investment. As Russell and Young note, “...energy improvement proposals compete with (rather than contribute to) these primary investment goals.”<sup>11</sup>

**Complex Decision-Making Processes.** Industrial customers often involve numerous staff in capital expenditure proposals, who have competing operational priorities. Russell and Young observe: “Large companies in particular... utilize an elaborate decision-making process to evaluate capital investment proposals. The vetting process for a specific proposal will often be conducted by a couple of teams: one that champions the proposal and the other with approval authority. The project champion team may be comprised of an energy manager plus staff from engineering, maintenance, and/or production. The approval team may include managers from operations, finance, environmental/ health/safety, marketing, regulatory affairs, and/or other departments. Corporate review may examine economic, regulatory, and legislative considerations ...In general, expect leaders from operations and finance to carry the greatest weight for approval decisions.”<sup>12</sup> 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.

**Financing Can Be a Challenge.** Micro/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., OBF, \$5,000 minimum loan amount).

**Difficulty Stopping Production for Improvements.** Unlike other customer segments, which may experience seasonality to their business activities and energy usage (such as agriculture customer usage that varies during harvest, post-harvest, and off-season), industrial customers often produce year-round. Moreover, many manufacturing facilities operate production lines in multiple shifts over a 24-hour period. Energy efficiency improvements that require shutting down one or more process lines or machine do not appeal to the customer.

**Awareness of Utility Energy Savings Programs.** Many customers are not aware of utility energy savings programs and the potential benefits of participating in these programs. Among those customers that are

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<sup>9</sup> Russell, Christopher and Young, Rachel. " Understanding Industrial Investment Decisions". ACEEE Report IE124. October 2012.

<sup>10</sup> Heschong Mahone Group, Inc., 2012.

<sup>11</sup> Russell, Christopher and Young, Rachel. 2012.

<sup>12</sup> Ibid.

aware, many choose to not participate in energy savings programs because they do not believe the benefits are worth the required expenditure of resources.

## Proposed Solutions

**Conduct Market Research.** Conduct customer market research 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.

**Promote On-Bill Financing and Other Financing Offerings.** Promote the On-Bill Financing and other financing for energy efficiency investments via financial workshops and other outreach activities. Coordinate delivery of dual-fuel program offerings among program administrators to allow energy efficiency project loan amounts to meet minimum financing thresholds.

**Increase Program Promotion and Coordination with Trade Allies.** Based on the results of the market research, SoCalGas will develop plans for increasing customer engagement through outreach and coordinate with a robust trade ally network. This effort will increase awareness of energy efficiency programs especially targeted to the Micro/Small customer through various promotional channels.

## Partners

**Program Administrators.** SoCalGas will coordinate with program administrators to conduct market research that will identify and better understand unique barriers to energy efficiency investments. We will collaborate with program administrators to the extent that program modifications are necessary to ensure we leverage all available best practices and promote statewide consistency if appropriate.

**Trade Allies.** SoCalGas will collaborate with trade allies to increase program promotion and customer awareness of the benefits of energy efficiency investments.

## **Problem Statement #4: Complex and varied operations among a diverse industrial sector make it difficult to provide program services that fit the needs of all customers.**

Convincing industrial customers to invest in energy efficiency is challenging due to the large number of accounts and the variability in terms of customer size and energy-using processes. Benchmarking and establishing a baseline for energy use are critical aspects of awareness of energy use and are necessary to measure and track the actual energy savings. Benchmarking, however, is a challenge for industrial customers due to variability and that industrial customers use energy in a fundamentally different way than residential and commercial applications, meaning many established energy efficiency programs for these sectors do not translate to the industrial sector.

## Observations

**Unique and Diverse Operations Make Benchmarking Challenging.** Establishing benchmarks and baselines for energy use is complicated by the variability of operations of facilities across the industrial sector. Where comfort and convenience are paramount at home and important drivers in the commercial sector, the industrial focus is on energy creating value by transforming material. Even among organizations with very similar products, the manner in which energy is applied to form those products can be markedly different.<sup>13</sup>

Month-to-month and year-to-year, variations in product mix, processes, operating schedules, raw materials, and other factors directly impact the ability to develop benchmarks and create baseline models of energy use, which may require extended baseline periods. Short-term and long-term variations in operating conditions at industrial facilities can affect energy use. Operating conditions that can vary include product mix, processes, operating schedules, and raw materials. This variability complicates the establishment of reliable energy benchmarks and baseline energy use. To establish reliable benchmarks and baselines, monitoring of numerous process variables and sub-metering of energy use over an extended time period may be required. This creates difficulties in establishing meaningful benchmarks and assessing what constitutes industry standard practice.

Additional consideration is that industrial customers are more likely to be unwilling to share proprietary, competitive information/data that is required for energy use benchmarking.<sup>14</sup> The complexity of developing industrial benchmarks is described in the 2013 ACEEE paper on Plant Energy Benchmarking.<sup>15</sup>

**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. Without technical assistance to develop the ability to normalize and track energy use, industrial customers are not able to see the impacts of operational variables on energy costs and the benefits of energy savings measures.<sup>16</sup> Most customers also do not understand the primary factors that contribute to the cost of energy to operate their facility. These factors include efficiency of large energy-using equipment, impacts of poor equipment operational & maintenance (O&M) procedures, and operating schedules. Contacts with industrial customers as part of the SoCalGas' Continuous Energy Improvement (CEI) program have shown that most industrial customers have not routinely tracked energy use in the past. Even customers that have tracked energy use have not accounted for the impact of operating variables, including production rate, on energy use. As a result, energy use and the impact of operational variables on energy use is not well understood by many industrial customers.

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<sup>13</sup> Freeman, S. L., M. J. Niefer, et al. (1997). "Measuring industrial energy intensity: practical issues and problems." *Energy Policy* 25(7-9): 703-714

<sup>14</sup> To date, the Energy Star program has developed benchmarks for eleven manufacturing plant types. See <https://www.energystar.gov/buildings/facility-owners-and-managers/industrial-plants/measure-track-and-benchmark/energy-star-energy>.

<sup>15</sup> Boyd, Gale, Tunnessen, Walt (2013), "Plant Energy Benchmarking: A Ten Year Retrospective of the ENERGY STAR Energy Performance Indicators (ES-EPI)", 2013 ACEEE Summer Study on Energy Efficiency in Industry

<sup>16</sup> Sun, C., Williamson, M. (1998). "Industrial Energy Use Benchmarking." 1999 ACEEE Summer Study on Energy Efficiency in Industry

**Complex and Diverse Industrial Processes Have High Potential for Energy Savings but Require Specialized Expertise.** These types of processes typically have large energy savings potential because they often operate under sub-optimum conditions. Identifying energy savings measures that go beyond traditional measures (e.g., lighting, HVAC, compressed air, high efficiency boilers, etc.) requires specialized expertise on the part of the program implementers and assigned account representatives.

## Proposed Solutions

**Develop a Strategic Energy Management (SEM) Approach to Capture Long-term Energy Savings.** Utility supported SEM programs (e.g., Continuous Energy Improvement Program) are well suited to drive vendor/technology-neutral energy savings, making them a good fit for this diverse customer sector. Through this approach, the customer is supplied with training, evaluation, and measurement and verification tools to value energy savings, but the method by which savings are achieved is left up to the customer. This allows the program to drive increased market action by shifting the conversation with the customer from “What rebates are available?” to “How can your business gain a competitive advantage by managing energy?” SEM supports the tailoring of an energy savings program for a customer facility by providing customers with assistance in strategic planning which incorporates energy awareness and energy management into business operations. It also facilitates the development of written procedures to document and quantify energy savings for O&M and behavior measures.

**Leverage Legislative/Regulatory Support to Encourage Industrial O&M and Behavioral Savings.** AB 802 has opened the door to use normalized metered energy consumption with a whole-building approach to capture savings from non-traditional measures including O&M and behavior measures. A similar approach for industrial facilities based on the use of normalized metered energy consumption as part of a SEM program has the potential to provide savings from O&M, behavioral changes, and non-capital process improvements.

**Utilize Normalized Metered Energy Consumption to Measure Savings.** This approach involves the development of energy models that correlate energy use with facility operating variables for the baseline period at the facility. The energy models can then be used to normalize baseline energy use to post-intervention operating conditions. The difference in baseline and post-intervention energy use then represents energy savings attributable to the energy savings measures independent of changes in facility operating conditions.

## Partners

**Industrial trade organizations.** Industrial trade organizations can provide an effective path to industrial sector partnerships, particularly by serving as a trusted source of information about business concerns facing specific industrial sub-sectors. 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 established communications channels within the industrial sector 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.

**External technical resources.** (e.g., deep dive industrial equipment/system analysis)

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. As an example, as part of the CEI program, technical assistance was provided to a metal forging facility on the operation of their furnaces. Recommendations involved improved operational procedures to control furnace excess O<sub>2</sub> levels based on the type of alloy as well as the installation of improved temperature and O<sub>2</sub> controls to more precisely control furnace conditions. A savings in natural gas use of 40% was identified.

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