

## *Stage 2*

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

05/13/2016



## Contents

Introduction .....	2
Agricultural Sector Market Characterization .....	2
Agricultural Account Segmentation by Annual Gross Sales and Usage .....	3
Agricultural Sector Segmentation by NAICS Codes.....	4
Agricultural Sector Energy Usage.....	5
Agricultural Sector Energy Savings .....	6
Agricultural Sector Incremental Market Potential.....	7
Overview of Current Program Offerings .....	8
Resource Programs .....	9
Non-resource Programs.....	9
Problem Statement and Solution Overview .....	10
Problem Statement #1: A considerable number of small agricultural customers lack technical and financial resources. ....	12
Proposed Solutions .....	13
Problem Statement #2: Offering program services and measures can be challenging given the diversity of agricultural sub-segments. ....	14
Observations .....	15
Proposed Solutions .....	16
Problem Statement #3: The Agriculture sector has competing priorities, which may overshadow energy efficiency. ....	17
Observations .....	17
Proposed Solutions .....	18
Bibliography .....	19

## 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 lead the region in delivering innovative customer assistance and energy efficiency programs that provide value to our customers, are sensitive to the environment, stimulate the economy, and make a difference in the communities we serve. SoCalGas's core energy efficiency values are to provide cost-effective, customer-centric solutions that will ultimately support the economic viability of our agricultural customers. Our vision is to offer a suite of solutions that incorporates the best available technologies and services valued by our agricultural customers, contributes to achievement of the SoCalGas energy savings goals, aligns with the California Long Term Energy Efficiency Strategic Plan (CLTEESP), and advances 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 agricultural sector within the SoCalGas service area in terms of energy usage, energy savings, and estimated incremental energy savings potential. The heart of this document presents problem statements that reflect what we feel are the most important obstacles to achieving our energy use reduction goals, observations about the problem statements, and proposed solutions that will be explored further throughout the business planning process. SoCalGas will solicit stakeholder feedback on this document to incorporate into its comprehensive Business Plan.

## Agricultural Sector Market Characterization

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 yams – that provide the greatest agricultural bounty of any state in the country.<sup>1</sup> 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.

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

---

<sup>1</sup> Navigant Consulting, Market Characterization Report for 2010-2012 Statewide Agricultural Energy Efficiency Potential and Market Characterization Study, April 2013.

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 faces issues in water and labor. Water availability is a very large concern for growers as a result of persistent droughts in California; limited water availability is leading to increased water pumping. Furthermore, 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 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.

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 Account Segmentation by Annual Gross Sales and 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 (USDA) 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 to be family and/or residential farms with annual revenues below \$250,000, whereas farms above that cutoff are considered commercial farms.<sup>2</sup> 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 non-residential farms with revenues above \$100,000. 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 has many impacts on 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.<sup>3</sup> These factors make small farms an important segment in California's agriculture sector.

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 accounts. 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.

---

<sup>2</sup> The National Commission on Small Farms selected \$250,000 in gross sales as the cutoff between small and large farms. Extension.org, USDA Small Farm Definitions, August 2013.

<sup>3</sup> J. Stumbos, Small Farmers: Who are they and why do they matter? California Agriculture 47(2):6-7, March 1993.

SoCalGas has divided its agricultural 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's agricultural customers fall into the Micro and Small categories. Table 1 details the number of SoCalGas customers the farm segments by gas consumption using the SoCalGas classifications.

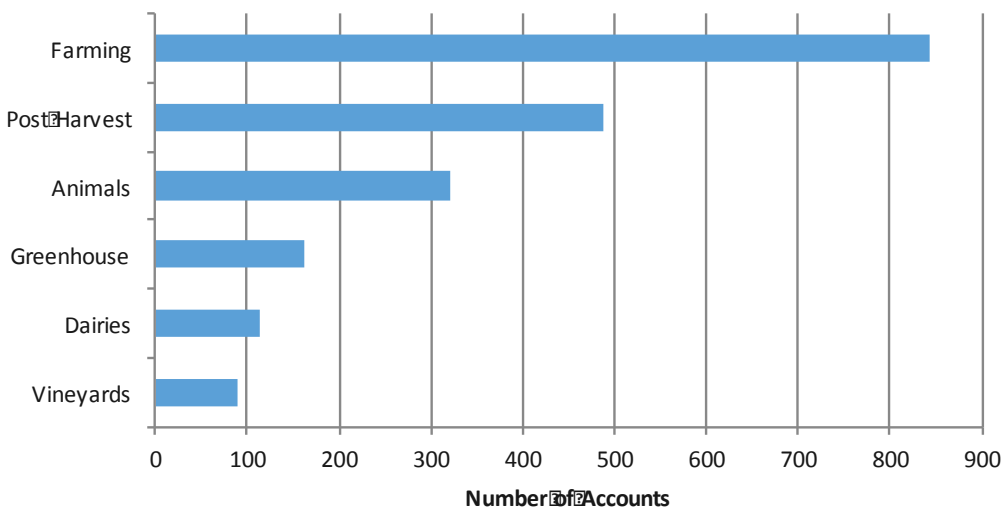
**Table 1. SoCalGas Farm Categories by Usage**

	Average Annual Consumption (Therms)	# of SoCalGas Customers	Total Energy Use (Therms)
<b>Micro</b>	0 - 12,000	1,225	3,194,967
<b>Small</b>	12,000 - 50,000	517	13,416,079
<b>Large</b>	> 50,000	273	62,193,807
<b>Total</b>		<b>2,015</b>	<b>78,804,853</b>

## Agricultural Sector Segmentation by NAICS Codes

As shown in Figure 1, the SoCalGas agriculture sector is defined by six NAICS segments: 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. As shown in Figure 1, there are also Post Harvest, Animal/Livestock, and Greenhouse accounts.

**Figure 1. Agricultural Sector Accounts by NAICS Segment**



## Agricultural Sector Energy Usage

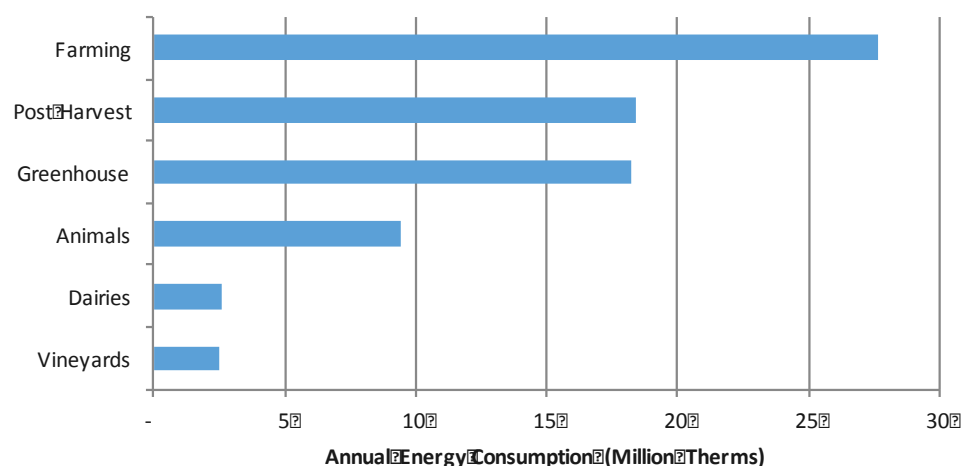
Agricultural customers primarily use gas for space heating, greenhouse operations, animal comfort, and some water pumping. One-quarter of gas consumption among SoCalGas's agricultural customers is used by a few large accounts, yet the vast majority of customers use little gas (as shown in Table 2). The 2,015 SoCalGas agriculture customers consume approximately 79 million therms annually. Seven customers use over one million therms annually, while approximately 500 of SoCalGas's agricultural customers use between 50,000 – 12,000 therms annually. The majority of the agricultural customers (1,225) consume less than 12,000 therms annually.

**Table 2. SoCalGas Agriculture Account Distribution by Usage**

	Number of Accounts	Total Energy Use (Therms)
> 1MM Therms	7	20,027,972
250K - 1 MM Therms	44	18,967,627
50K - 250K Therms	222	23,198,208
12K - 50K Therms	517	13,416,079
0 - 12K Therms (Micro)	1,225	3,194,965
<b>Total</b>	<b>2,015</b>	<b>78,804,851</b>

As shown in Figure 2, the Farming segment accounted for the largest annual energy consumption from 2010-2015, followed by Post Harvest and Greenhouse segments. On average, greenhouses use more energy per account than any other market segment.

**Figure 2. Agricultural Sector Energy Usage by NAICS Segment**



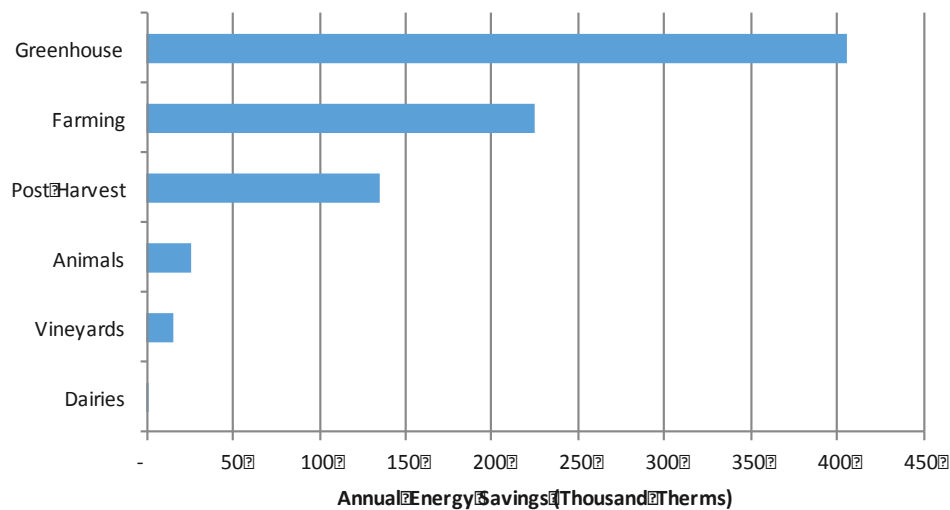
The total agriculture sector usage represents less than 5% of the total nonresidential customer load. However, there are current trends in various agricultural segments where increases in natural gas consumption are likely to occur. For example, the greenhouse and nursery segment is an important and expanding component in California's agricultural market, and is the largest natural gas consumer within the State's agricultural market.

## Agricultural Sector Energy Savings

The agricultural sector programs (summarized on page 8) delivered approximately 10% of the SoCalGas portfolio savings between 2013 and 2015. From 2010 to 2015, SoCalGas agricultural customers saved a total of 4.8 million therms of gas. As shown in

Figure 3, Greenhouses accounted for the largest portion of agricultural sector program savings— just over 400,000 therms per year. Farming and Post Harvest also accounted for considerable savings.

**Figure 3. Agricultural Sector Energy Savings by NAICS Segment**



Between 2010 and 2015, Greenhouses saved the largest percentage of consumption as shown in Figure 4. Greenhouses saved 2.2% of all gas usage. Farming and Post Harvest saved 0.8% and 0.7% of usage, respectively.

**Figure 4. Annual Savings and Consumption by NAICS Segment**

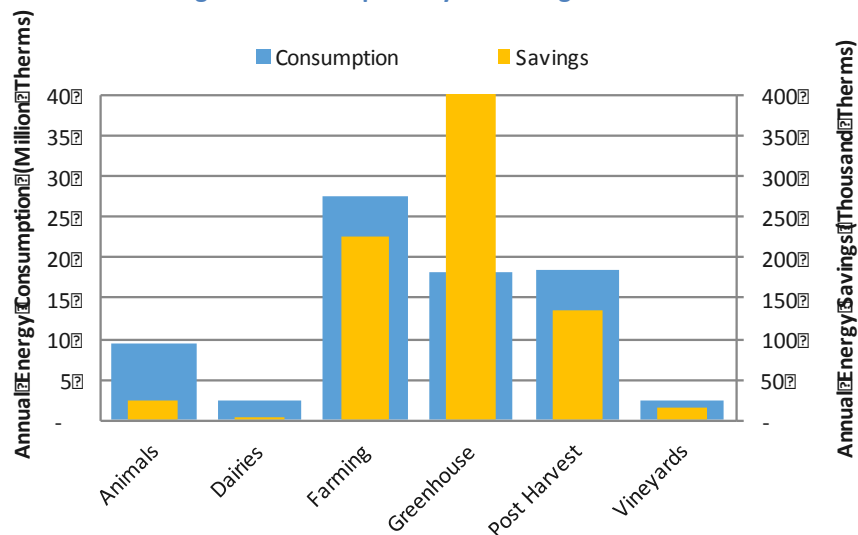
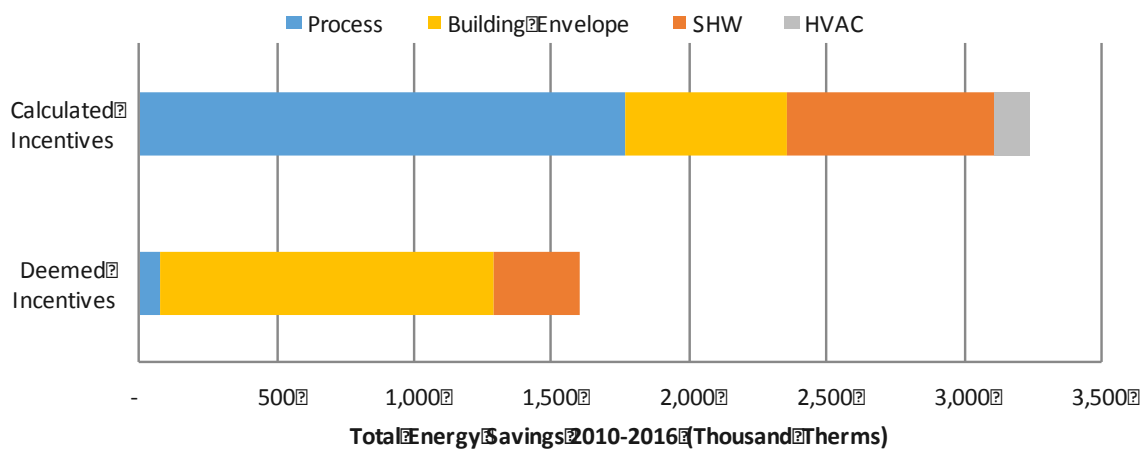


Figure 5 depicts the total energy savings from the agricultural sector by end use and by program. The largest energy savings come from process heating measures, followed closely by building envelope measures. The majority of agricultural energy efficiency savings results from the Custom-Calculated Incentives program.

**Figure 5. Total Energy Savings by End Use and by Program**



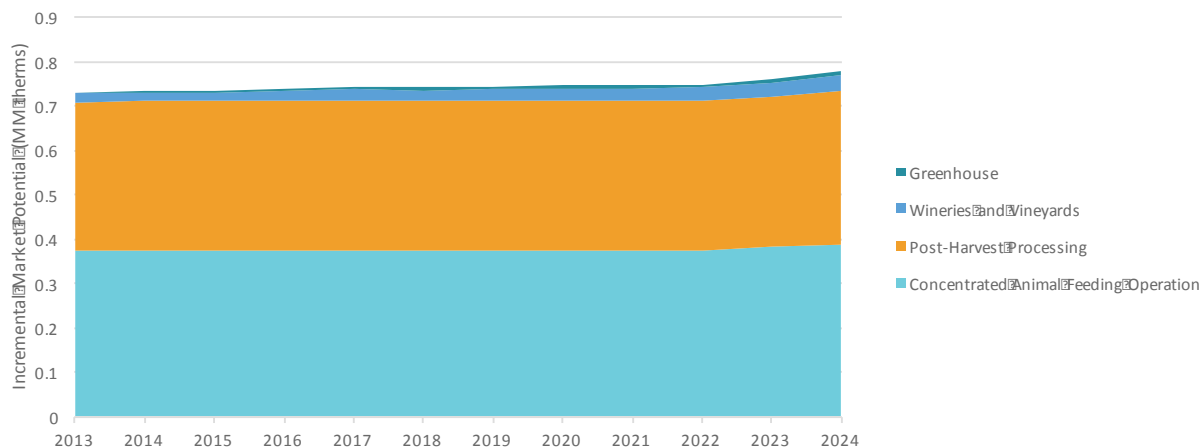
## Agricultural Sector Incremental Market Potential

The SoCalGas agricultural sector gap analysis (completed for Phase 1) indicated that agricultural energy efficiency market potential lies between 0.7 and 0.8 million therms annually from 2016 and 2024. Some specific areas identified as potential applications for energy efficiency program intervention include system-level solutions, such as **system optimization services** and **water pumping, conveyance & 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. High potential market sub-segments include **greenhouses and nurseries, mushroom growers, fruit and tree growers, and urban farming**. In a separate statewide study, Navigant Consulting estimated the highest potential savings from 2015 to present to be in Concentrated Animal Feeding Operations (CAFOs) and Post Harvest Processing (Figure 6).<sup>4</sup>

<sup>4</sup> 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 6. Estimated Potential Natural Gas Energy Savings for SoCalGas Agricultural Customers, Statewide Potential Study**



## Overview of Current Program Offerings

The **Statewide Agricultural Energy Efficiency (AEE) Program** facilitates the delivery of integrated energy management solutions to California's agricultural customers. The program offers a suite of products and services, such as strategic energy planning support, technical support services, facility audits, pump tests, calculation/design assistance, financing options, and financial support through rebates and incentives. In addition, the program adopts and supports the strategies and actions of the Agricultural and Industrial chapters of the CLTEESP.

The Statewide AEE Program targets end-users such as irrigated agricultural growers (crops, fruits, vegetable, and nuts), greenhouses, post harvest processors (ginners, nut hullers, and associated refrigerated warehouses), and dairies. Due to NAICS designations, food processors have traditionally received IOU services through the Industrial program offering. However, facilities exist with on-site processing integrated with growers and their products. This is the case with some fruit and vegetable processors (e.g., canners, dryers, and freezers), prepared food manufacturers, wineries, and water distribution customers that may be addressed by the agriculture sector program offerings.

To address the potential in these markets, the Statewide AEE Program offers two resource subprograms, summarized below.

## Resource Programs

The **Agricultural Deemed Program (Rebates)** delivered 1.6 mm therms from 2010 to 2015. Deemed rebates remain a simple and cost-efficient way for small to medium size customers to engage in our programs. The program also features rebates per unit measure for installed energy-saving projects. It provides customers and equipment vendors an easy-to-use mechanism to adopt energy efficiency measures through fixed incentive amounts. Agricultural customers currently have a limited selection of qualifying energy efficiency measures, and measures related to electric water pumping comprise much of this selection. For SoCalGas, the most popular energy efficiency measures include the greenhouse heat curtain and greenhouse infrared film. Overall, the program fell short of its projected 2015 savings goal objectives.

The **Agricultural Energy Efficiency Calculated Incentive Program (EECIP, or Custom-Calculated)** is a custom offering that delivered 3.3mm therms from 2010 through 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. In this sector, water-energy nexus efforts were identified in areas that use natural gas engines as the source to deliver and treat water.

During 2015, SoCalGas utilized a project checklist to further document early involvement in the project development process and standardize verification of project post-installation results. SoCalGas also provided training and performed quality control procedures in order to screen out ineligible projects. In addition, a team was created to continually review and improve impact methods and models through review of evaluation results, consideration of industry best practices, and collaboration with the Energy Division's ex ante review team.

## Non-resource Programs

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

One key offering is the **Continuous Energy Improvement (CEI)** program. The Agricultural CEI subprogram is a consultative service that is aimed at helping agricultural customers engage in long-term, strategic energy planning. CEI helps customers better manage energy using a comprehensive approach that addresses both technical and management improvement opportunities and creates sustainable practices through a high-level commitment from executive-level management.

To provide technical assistance to customers, SoCalGas also offers the **Energy Advisor (EA)**, which is an audit service that can fund surveys, including pump testing, and is a potential "next step" for customers in their education. This subprogram utilizes outreach initiatives and data driven interactive tools designed to engage and motivate customers to reduce their energy consumption through personalized program recommendations. The 2015 program did not involve new engagements with agricultural customers but continued the review, evaluation, and analysis of the engagements that were begun during 2013-2014.

The remainder of this document identifies the most important 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 and Solution Overview

Table 3 provides an overview of the problem statements and corresponding proposed solutions. As shown, we group solutions into four categories that provide a logical general framework for the overarching strategies and programmatic shifts SoCalGas will use to deliver energy efficiency solutions to its agriculture customers: Market & Customer Knowledge, Energy Efficiency Technologies & Services, Program Design, and Outreach & Delivery. As summarized in Table 4, SoCalGas plans to coordinate and partner with numerous entities to implement these solutions.

The rest of this section describes the problem statements, observations, solutions, and partnerships in more detail. For those proposed solutions that address more than one problem statement, their descriptions explain how the solution uniquely addresses each problem statement.

**Table 3. Overview of Problem Statements and Proposed Solutions**

Proposed Solutions	Problem Statements		
	1: Small customers' lack of technical, financial resources	2: Diversity of Agriculture sub-segments	3: Customers' competing priorities
<b>Market &amp; Customer Knowledge</b>			
Analyze existing data to inform opportunities.	X		
Develop industry baselines.		X	
<b>EE Technology &amp; Services</b>			
Consider new program offerings, measures, and technologies.	X		X
<b>Program Design</b>			
Leverage financing options for small farms.	X		
Focus on sub-segments with potential		X	
Provide a simple, integrated program that promotes whole system optimization.		X	X
Create an Urban Agriculture sub-segment.			X
<b>Outreach &amp; Delivery</b>			
Increase Coordination with Trade Allies to Reach Customers.	X		
Coordinate with other entities (universities, Farm Bureau, USDA, etc.) and programs.	X	X	X
Increase advertising and outreach with focus on long-term benefits.	X		
Leverage sustainability movement in agriculture to encourage energy efficiency.		X	
Cross-promote water efficiency.			X

**Table 4. Examples of Partners Organized By Proposed Solution Categories**

Potential Partners	1: Small customers' lack of technical, financial resources	2: Diversity of Agriculture sub-segments	3: Customers' competing priorities
Other program administrators	X	X	X
Water districts	X	X	X
Industry associations	X		X
Trade allies and vendors	X		X
State and federal agencies		X	X
Universities	X	X	X
CPUC	X	X	X
Financial institutions/banks	X		

## **Problem Statement #1: A considerable number of small agricultural customers lack technical and financial resources.**

Small farms face numerous challenges when it comes to implementing energy efficiency projects at their facilities. These challenges include: financial barriers, lack expertise, regulations, and consistent water supply. Financially, the upfront cost of energy efficient equipment may be a significant burden for this sector, where ninety percent of farmers rely on an outside job or some independent form of wealth for their primary income. Additionally, smaller farms lack staff with the expertise to increase energy efficiency levels. Continuous modifications to industry regulations and compliance guidelines pose an additional challenge. Finally, small farms consider their crop yield as highest priority, and may face additional challenges such as drought and, therefore, an inconsistent water supply. In this environment, energy efficiency considerations are an afterthought and the associated upfront costs are a major barrier. Further reinforcing this notion, in the 2012 Navigant Agriculture Market Study, all of the segments indicated that first-cost of equipment and lack of financing options prevented investment in efficient equipment and energy management.

### **Observations**

**Small Farms Do Not Support Themselves Through Agriculture Alone.** Per USDA data from 2014, Intermediate size farms obtain only 7 percent of their household income from the farm and 93 percent from an off-farm source. Most residential and intermediate-sized farms actually lost money farming and earned a large percent of their household income from off-farm sources. Only the commercial farms, which represent just 10 percent of farming households in the country, earned the majority of their income from farm sources.<sup>5</sup>

---

<sup>5</sup> US Department of Agriculture, Farm Household Income (Historical), May 2016.

**Energy Efficiency May Not Be 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 business cases to allocate capital for energy efficiency projects. Water and irrigation projects are higher priorities. This issue affects all agriculture customers to some extent (discussed more in Problem Statement #3), but may be especially challenging for small farms given their already-constrained resources.<sup>6</sup> Small farms are also particularly affected by the burdens of regulatory compliance.<sup>7,8</sup>

**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.<sup>9</sup>

## Proposed Solutions

**Market & Customer Knowledge: Analyze Existing Data to Inform Opportunities.** The vast majority of the agriculture sector consists of small natural gas customers. To efficiently deliver energy efficiency solutions, SoCalGas needs to develop a deeper understanding and a comprehensive analysis of the customers with the highest potential for energy savings. With new gas Advanced Metering Infrastructure (AMI) technology, data analytics can be deployed to quickly and clearly identify the customers with the highest energy efficiency potential and separate them from the customers with minimal energy efficiency potential.

**EE Technology & Services: Consider New Program Offerings, Measures, and Technologies.** Emerging technology efforts typically focus on commercial sector applications for the technologies. However, SoCalGas has an opportunity to conduct a greater examination of emerging technology and service trends relevant to the agricultural sector (e.g., greenhouses, automation, water management, etc.). Technology innovations from SoCalGas's Innovation Now! can produce greater opportunities for small and large farms alike.

---

<sup>6</sup> Navigant Consulting, Measure, Application, Segment, Industry (MASI): Agriculture, Prepared for Southern California Edison, 2015.

<sup>7</sup> Sean Hurley and Jay Noel, An Examination of the Regulatory Cost on California Agricultural Producers, American Agricultural Economics Association Annual Meeting, 2006.

<sup>8</sup> David Hurley, Does One Size Fit All? Small Farms and US Meat Regulations, Environmental Health Perspective, 116(12), December 2008.

<sup>9</sup> Sustainable Agriculture Education. Coyote Valley Greenbelt Research for City of San Jose. June 2015.

**EE Technology & Services: Increase Coordination with Trade Allies to Reach Customers.** Cooperation with trade associations, University of California, and vendors may open new avenues through which to promote energy efficiency emerging technologies and processes. This will create greater reach and, most importantly, inform agricultural customers about emerging energy efficiency opportunities.

**Program Design: Leverage Financing Options for Small Farms.** To address the upfront cost challenges small farms face when considering energy efficient options rebates may need to be supplemented with no-to-low-cost financing options. Partnering with agriculture-focused banks and leveraging on-bill financing repayment programs may be effective means of reaching customers who would be interested in using financing to fund energy efficiency.

**Outreach & Delivery: Coordinate with Other Entities and Programs.** The 2014 Farm Bill provided funding for the USDA Environmental Quality Incentives Program (EQIP). The EQIP program is available to all producers, regardless of operation size or type of crop produced. The program allows eligible participants to receive financial and technical assistance to implement conservation practices. While most of these practices relate to land and crop management, EQIP also provides incentives for on-farm energy audits.<sup>10</sup> Small farms in particular are the most strapped for capital and may benefit most from additional financial incentives for energy audits. To help make the case for energy efficiency as a priority, utilities may benefit from coordination with programs like EQIP.

**Outreach & Delivery: Increase Advertising and Outreach with Focus on Long-Term Benefits.** As small farms are often limited financially, a targeted marketing and outreach campaign which focuses on the benefits of energy efficient farm equipment may help encourage small farms to consider the value proposition of energy efficiency and reduced GHG emission reductions. This could include partnerships with other entities (such as trade associations and universities) that work with the agriculture sector, and an increased presence at agriculture shows and expos (such as the California Farm Bureau annual meeting). Specifically, including a discussion of the long-term financial and environmental benefits relating to equipment payback and reduced emissions may garner additional interest to pursue EE upgrades.

## **Problem Statement #2: Offering program services and measures can be challenging given the diversity of agricultural sub-segments.**

Unlike other, more homogenous market sectors, the agricultural sector contains numerous sub-segments with unique needs, priorities, expansion potential, growing seasons, and energy use. As examples, dairy farms, greenhouses, field crops, orchards, and livestock farms all fall within this broad category, and each have differing energy use and efficiency needs. As such, it is important to account for these differences, as well as emerging market trends, when designing and delivering energy efficiency programs to agriculture customers.

---

<sup>10</sup> Navigant Consulting, Measure, Application, Segment, Industry (MASI): Agriculture, Prepared for Southern California Edison, 2015.

## Observations

**Integrated Farms.** Some agricultural facilities integrate 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 activities. Therefore, energy efficiency programs may need to address a wide variety of end uses from a single source.<sup>11</sup>

**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 with key industry stakeholder groups can be very influential upon the customer's energy efficient behaviors and decision-making.

**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.<sup>12</sup>

**Increasing Opportunities for Energy Efficiency.** 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. For example, the 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 in South America.<sup>13</sup>

There are a number of sub-segments and technologies that may present ample opportunities for energy efficiency programs within the agriculture market. New trends in farming, such as farm-to-table and urban farming place a high priority on local and sustainable produce, as well as community connections.<sup>14</sup> Energy efficiency fits in well with these trends, and presents an additional way farms can market themselves as "green" and sustainable while contributing to the well-being of the community.

**Movement Towards Mechanization.** As a result 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 if a customer transitions to more automated processes.

---

<sup>11</sup> Energy & Resource Solutions – Nonresidential Program Assessments: Third-Party Industrial and Agricultural Program Group, Navigant, 2012

<sup>12</sup> Navigant – Measure, Application, Segment, Industry (MASI): Agriculture, 2015

<sup>13</sup> Ibid.

<sup>14</sup> About Urban Farming, Urbanfarming.org, Accessed May 2016.



**Agriculture Facilities May Require More 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.<sup>15</sup>

## Proposed Solutions

**Market & Customer Knowledge: Develop Industry Baselines.** Collaborate with industry stakeholders to create industry baselines in order to gauge current efficiency levels within various segments to drive to higher EE levels over time.

**Program Design: Provide a Simple, Integrated Program that Promotes Whole System Optimization.** Provide customers a simplified, holistic approach to saving energy that includes offering agricultural energy audits and using a systems approach to design agricultural incentives that bundle sets of energy efficiency measures needed to address multiple aspects of a system. Recognize the agricultural customer is multi-dimensional in its energy usage by acting as both a commercial and residential customer. Provide an integrated program offering that brings together multiple energy efficiency programs in a simplified approach.

**Program Design: Focus on Sub-Segments with Expansion Potential.** Offer segment-specific program offerings to expanding segments, including the greenhouse and nurseries and urban farming, to establish best energy efficiency practices in these industries. Provide demonstration projects for various EE technologies, especially for the greenhouse and nurseries segment where there is considerable demand to improve production, reduce water consumption, and reduce GHG emissions.

**Outreach & Delivery: Coordinate with Other Entities and Programs.** Partner with universities, vendor communities, industry associations, and customer segment groups to promote greater awareness of specific, actionable energy efficiency and conservation measures specific to the agricultural customer segment. This will allow increased collaboration with customers and industry actors on emerging trends, such as farm mechanization, to promote energy efficiency opportunities.

**Outreach & Delivery: Leverage Sustainability Movement in Agriculture to Encourage Energy Efficiency.** Leverage the farm-to-table, urban farming, and healthy food movements to help agricultural customers intertwine energy efficiency and farming. Encourage energy efficiency as a messaging or marketing technique to promote “green” and sustainable agriculture facilities.

## Problem Statement #3: The Agriculture sector has competing priorities, which may overshadow energy efficiency.

Agriculture customers ultimately seek to optimize their crop production, which may sometimes be at odds with energy efficiency. Across all market sub-segments, many agricultural customers face similar challenges, such as dwindling water supply, land use management, and lack of commercialized agriculture-focused technology. These challenges frequently take priority over energy efficiency improvements, and make it difficult for this sector to invest and become leaders in energy efficiency. Solutions for this sector must demonstrate an understanding of these priorities, and deliver energy efficiency benefits through means that are convenient for agricultural customers.

### Observations

**Successful Production is Highest Priority.** While agricultural customers 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.<sup>16</sup>

**Farmers Must Consider Production Seasons.** Seasonality is a characteristic that impacts 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.

**Drought and Dwindling Water Supply a Large Concern.** The dwindling water supply causes 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.<sup>17</sup> 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.<sup>18</sup>

**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.<sup>19</sup>

---

<sup>16</sup> Navigant Consulting, Measure, Application, Segment, Industry (MASI): Agriculture, Prepared for Southern California Edison, 2015.

<sup>17</sup> Pacific Institute. Impacts of California's Ongoing Drought. August 2015.

<sup>18</sup> Walker et al., Measure, Application, Segment, Industry (MASI): Finding the Remaining Energy Efficiency Potential through Market Assessment, ACEEE Summer Study, 2015.

<sup>19</sup> Navigant Consulting, Measure, Application, Segment, Industry (MASI): Agriculture, Prepared for Southern California Edison, 2015.

## Proposed Solutions

**Customer & Market Knowledge: Create Urban Agriculture Sub-segment.** Create a sub segment called Urban Agriculture to anticipate any land use change.

**EE Technology & Services: Consider New Program Offerings, Measures, and Technologies.** Improve existing technologies and invest in new agriculture-focused technology that can be commercialized with all farms. With an ever-changing microclimate and water needs, program administrators need to implement technology assistance in crop replacement, water efficiency, and process heat. This will also allow SoCalGas to explore measures that may help address seasonality concerns of certain agriculture sub-segments.

**Program Design: Provide a Simple, Integrated Program that Promotes Whole System Optimization.** Implement a whole farm approach for onsite farm problems, thus focusing on variety of solutions for a near, mid, and long term solutions. This allows SoCalGas to better address the first-cost barrier and highlight long-term payback as a means of overcoming competing priorities. The solution must be simple and not burdensome to maximize return of investment on customers' money and time, given the competing priorities for agricultural customers' attention.

**Outreach & Delivery: Cross-promote Water Efficiency.** Collaborate with agricultural customers, water districts and other utilities to promote efficient irrigation that supports a reduction in water pumping and more efficient water conveyance approaches (e.g., water TOU rates, cost-effective canal seepage reduction, improved irrigation systems, tailwater return systems, canal automation, SCADA, regulating reservoirs etc.). Additionally, the utility pump audit program can also be combined with the water agency's water irrigation audit program. This will link energy efficiency and water efficiency, allowing SoCalGas to address agricultural customers' concerns about water scarcity while encouraging efficient equipment.

**Outreach & Delivery: Coordinate with Other Entities and Programs.** Leverage the USDA EQIP to supplement the high cost of large system upgrades. This will allow SoCalGas to help agricultural customers overcome competing priorities by making energy efficiency more accessible and affordable. Additionally, continue to leverage and build on local government partnership (LGP) outreach to this community like the rural coalition of customers that represent agricultural customers.

## Bibliography

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.

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.

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.

Urbanfarming.org. About Urban Farming. Accessed May 2016.

<http://www.urbanfarming.org/about.html>

US Department of Agriculture. Farm Household Income (Historical). May 2016. Accessed May 6, 2016.

[http://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/farm-household-income-\(historical\).aspx](http://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/farm-household-income-(historical).aspx)

Walker et al., Measure, Application, Segment, Industry (MASI): Finding the Remaining Energy Efficiency Potential through Market Assessment, ACEEE Summer Study, 2015.