

**PGE2001 AGRICULTURAL AND FOOD PROCESSING**

2006 - 2008

1. Projected Program Budget	\$47,523,134
See Tables in Attachment III for components	
2. Projected Net Program Impacts	
MWh	167,347
MW (Summer Peak)	22.797
Therms	3,082,952
3. Program Cost Effectiveness	
TRC	2.04
PAC	3.01

4. Program Descriptors

Market Sector: Agricultural and Food Processing Customers  
 Program Classification: PG&E  
 Program Status: New Program

The Agricultural and Food Processing program coordinates a diverse portfolio of products and services designed to enhance adoption of integrated demand side management among the diverse agricultural and food processing customers in PG&E's service area.

The objective of the Agricultural and Food Processing program is to provide the most cost effective, comprehensive, relevant portfolio of program elements for the targeted customers in order to deliver the kWh, kW, therms, demand response (DR), and distributed generation (DG) goals for PG&E's energy procurement strategy.

The Agricultural and Food Processing program seeks to involve customers, industry vendors and trade allies, third parties, technical industry consultants, and various partners (local, industry, state, national, and federal) in a cooperative environment that promotes energy management through the delivery of program elements described below.

The program integrates the following third party offerings:

- a) PowerLight's Winery and Wastewater Treatment Combined Approach to Solar and Efficiency (CASE) Program

This program will offer additional DSM services to PowerLight's existing and prospective photovoltaic (PV) system clients in the Agricultural Food Processing segments. In addition to the immediate benefits to our customer base and energy

efficiency portfolio, the model of the CASE program is well aligned with the overall objectives and direction of the CPUC's newly released California Solar Initiative (CSI) program.

b) D&R International's Wine Industry Efficiency Solutions (WIES) Program

This program is targeted to small and medium wineries and wine grape growers in PG&E's service area. This model assists customers with the confusing and often tedious tasks involved in implementing efficiency projects such as equipment specification, bid package development, contractor selection, project financing and project management.

c) VaCom Technologies' Industrial Refrigeration Performance Plus Program

This proposal targets refrigerated warehouses, food processors and related cooling operations that operate year-round or seasonally in the food and beverage sector, including processing, storage and distribution operations with industrial refrigeration systems as a large portion of their electric load. Existing facilities will be retrofitted, emphasizing refrigeration system improvements as well as addressing lighting, envelope, pumping, air handling and related process equipment.

d) Onsite Energy's Industrial Cold Storage/Food Processing Efficiency Program

Onsite has proposed a program targeting energy efficiency projects in the Refrigerated Warehouse and Food Processing market segments with enhanced incentives that will help meet the very short payback periods required by companies in these market segments to justify the investment. Proposals to customers will focus primarily on comprehensive refrigeration system retrofits, lighting retrofits involving new T-5 fluorescent fixtures, variable frequency drives on process pumps and fans, and comprehensive compressed air system measures.

e) EnSave Multi-Measure Farm Program For Dairies

EnSave is a continuing third party partner. EnSave will continue to promote five measures to the target market of PG&E's 1,300 dairy producers. Those measures are: milking vacuum pump variable speed drives, plate coolers, compressor heat recovery units, milk transfer pump variable speed drives, and scroll compressors.

5. Program Statement

Agriculture and Food Processing Market Characterization: PG&E's 89,000 agricultural and food processing customers consume approximately 6,300 GWh annually with a sum maximum peak demand of almost 1,680 MW. Customers in the segment are highly diversified and include small and large farms (dairies, greenhouses, crops, fruits, vegetables, and nuts) and food processors (including fruit and vegetable canners, fruit and vegetable dehydrators, fruit and vegetable freezers, prepared food manufacturers, wineries, and associated refrigerated warehouses). This market sector has very large

untapped potential for energy savings as well as good potential for demand response and distributed generation.

Target Sub-Markets in Agriculture and Food Processing Program: Recent PG&E experience has shown that markets respond significantly better to interventions targeted to unique market needs and behaviors instead of programs that provide generalized services across segments. Therefore, the Agriculture and Food Processing Program will deliver integrated program packages targeted to the following sub-markets:

- Agricultural
- Dairies
- Food Processing
- Wineries
- Refrigerated Warehouses

Targeted Strategies: These integrated strategies will include some or all of the following components:

- On-site audits and/or pump tests
- Engineering support and design assistance from industry experts for new construction and retrofit projects. This may also include energy modeling
- Public access to free modeling tools, such as EQuest, that facilitates whole system and whole building modeling
- Deemed and Calculated new construction and retrofit incentives, packaged for marketing purposes for the target market
- Education and training on energy efficiency, demand response and distributed generation specific to the sub-market
- Continuous commissioning through performance monitoring of equipment and systems, where appropriate
- Access to industry benchmarking information and resources
- Access to comprehensive market-based Program information, as well as relevant non-PG&E resources and information (CEC, DOE, EPA), through PG&E's Web and phone-based Clearinghouse

Crosscutting Elements: In addition, education, training and demonstrations on crosscutting energy management opportunities will be marketed to the whole Agricultural and Food Processing category. These interventions will focus on crosscutting efficiency technologies (pumps, motors, VFDs, industrial lighting, various emerging technologies, the water/energy efficiency connection), as well as appropriate distributed generation opportunities (biodigesters, solar, solar pumping, wind, cogeneration, combined heat and power).

Implementation: Various implementation and delivery strategies will be utilized in this Program, depending on the targeted sub-market. While farms and smaller dairies who have long ties to the community may tend to respond better to local implementers or Community Based Organizations (CBOs), a large food processor or refrigerated warehouse would tend to respond better to a dedicated industry expert who can provide integrated energy management analysis, monitoring, ongoing consulting, and long-range energy planning. Specific program delivery details are described further in Section 10 by market sub-segment, and will be clarified after the third party bidding process is completed.

## 6. Program Rationale

California is a global powerhouse in agriculture and food processing. Eight of the nation's top 10 farm counties (Fresno, Kern, Tulare, Monterey, Merced, Stanislaus, San Joaquin and Riverside) are in California. The State of California, as an entity, ranks fourth among nations in agricultural production. It is first in the U.S. for production of milk, fruits, vegetables, and wine, second in cheese, fifth in meat, and tenth in grains. While the number of agricultural customers and the associated farmland is falling in California, acreage per customer is rising and land under cultivation is used much more intensely than in the past. California's agriculture and food processing industries currently face intense competition from both global and national competitors, which creates both barriers and opportunities for improved energy management.

Untapped Opportunities: Significant untapped energy efficiency and demand response opportunities exist in the Agricultural and Food Processing market segments that are not realizing their potential under the current program design. By combining existing energy audits and design assistance with Deemed and Calculated incentives, gaps and overlaps that existed between programs can be resolved, resulting in a much more effective approach. Program administrative costs can also be reduced by capturing economies of scale and combining systems and staff functions.

Barriers Exist: Barriers to high performance energy management in these sectors vary, but include: lack of information about performance, technologies and resources; concerns over cost competitiveness in an increasingly global market; lack of facility level energy managers; short-term survival attitudes that delay efficiency improvements; lack of corporate capital resources for process improvements; lack of information on efficiency potential and ROI data, lack of ongoing system performance; and mandates to meet regulatory requirements for air and water quality.

Customers are Increasingly Receptive: Agricultural and Food Processing markets are increasingly receptive to resource efficiency programs as energy and water costs increase in a context of increasing global competitiveness, cutting into thin operating margins, and as efforts for pollution reduction, agricultural sustainability and environmental stewardship gain traction in California.

Energy and Non-Energy Benefits: PG&E's integrated program offerings will stress not only energy and related cost savings benefits, but also identify and educate customers about non-energy benefits that ultimately help sell energy efficiency and management project investments. For the Agricultural and Food Processing Program, these would include product quality improvements, better process control, associated water-use reduction, pollution credits, and marketing energy efficiency as a key component of corporate sustainability practices, among others.

Partnerships: Partnerships are a critical component of delivering the Agricultural and Food Processing Program. There are hundreds of industry-specific groups that can provide direct access to customer groups through their existing marketing channels, facilitating highly targeted marketing strategies. There are also dozens of existing energy efficiency and sustainability efforts that have helped lay the groundwork for PG&E's market-integrated program offerings. PG&E will be teaming with various food or agriculture-specific, industry-based organizations as well as local, California, multi-state, national, and federal programs to penetrate target audiences and develop interventions which serve both customer drivers and system energy efficiency needs.

The target market segments described below have both unique and common (crosscutting) energy management issues, barriers, and opportunities that will be considered in program implementation. The following descriptions describe the target markets and barriers. Opportunities and program implementation are described in Section 10.

### **Agricultural**

Agricultural Market Characterization: Agricultural customers in California use approximately 7 percent of total statewide electricity, and in PG&E's territory consumes 1,235 GWH per annum with a 451 MW peak demand. Most of PG&E's agricultural accounts are a broad mix of smaller accounts, predominantly serving pumping and irrigation needs – approximately 97 percent of meters are less than 200 KW. Pumping improvements account for 90 percent of the 127 GWh agricultural energy savings potential in this Program. Greenhouses in the agricultural sector provide good opportunities for gas savings through envelope and temperature control enhancements.

Lacking program interventions, agricultural customers do not tend to treat energy efficiency as a high priority. Pumps are not regularly tested and refurbishment of old, lower-efficiency pumps occurs beyond the point at which pump replacement would be the most economic option over the long term.

Barriers

- Smaller farms spread widely throughout the territory are difficult to target through centrally controlled programs. Agricultural customers tend to respond best to local implementers familiar with their business.
- Lack of unbiased information on system performance, underutilized or emerging technologies, and potential savings from retrofit projects or enhanced new construction designs
- Lack of awareness about applicable distributed generation technologies appropriate for agricultural uses, such as wind or solar-based technologies.
- Lack of awareness about available resources such as utility efficiency and demand incentive programs and federal loan and grant programs
- Capital constraints
- Slow technology transfer from other industries

While many of PG&E's agricultural customers use diesel pumps, there are recent pollution control efforts underway that encourage agricultural customers to replace diesel pumps with electric pumps. As of June 2005, the CPUC approved the Agricultural Internal-Combustion Engine (AG-ICE) program, a joint program between farm groups, PG&E and Southern California Edison to encourage farmers to phase out use of diesel irrigation pumps and replace them with electric engines. As of Aug. 1, both SCE and PG&E will offer special incentive electricity rates to encourage agricultural customers to make the conversion. While this program is not part of PG&E's integrated DSM programs, it presents an ideal window of opportunity for PG&E to work with California's farms, agricultural water districts, motor distributors and other local resources to encourage the purchase of premium efficiency motors and pumps for farm irrigation purposes. The AG-ICE effort will be very closely coordinated with PG&E's demand response program efforts. As electric motors replace diesel engines every effort will be made to minimize contributions to critical peak loads. In addition to the use of agricultural pumping rates that provide significant financial incentive for off-peak pump use, PG&E will endeavor to place new pumping customers in the new DR programs. The CPA-DRP, sponsored by the California Power Authority, may be particularly useful given the small size of most pumping customers, although PG&E will encourage aggregation of small pumping loads in order to provide access to the broader array of PG&E DR rate offerings.

PG&E's agricultural program component will act as a single point of coordination for all energy management options available to farmers to improve energy efficiency and IDSM in both process and non-process loads, through education and trainings, operations and maintenance materials and manuals, pump tests, energy efficiency and demand response incentives, and demonstrations. The program will be delivered through a combination of PG&E Account Representatives, industry experts and third parties, and pump testers. The program will coordinate with other significant energy management programs available to farmers, such as CEC water programs.

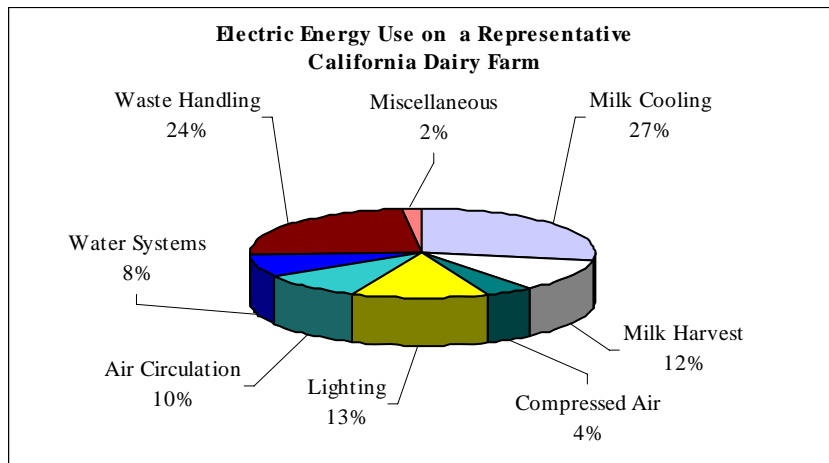
**Dairies**

Dairy farms are targeted as an agricultural sub-market because they do not fall neatly within either the agricultural market (irrigation) or within the food processing segment (large industrial process systems), but share characteristics of both. They are energy intensive facilities with excellent potential for energy efficiency and distributed generation.

Dairy Market Characterization: California leads the nation in milk production. There are approximately 1,950 dairies in California, most of which fall in PG&E’s Tulare, Fresno, Kern, Merced, Stanislaus, and San Joaquin counties. Dairy farms have been rapidly expanding in PG&E’s territory as dairymen move operations from higher priced land in Southern California Edison’s territory into PG&E’s Central Valley. As milk is a low-cost product and dairy production can have thin profit margins, smaller family-owned dairies are selling and being replaced with mega-dairies that consolidate operations to take advantage of economies of scale. Whereas traditional family dairies might have had a few hundred cows, typical new dairies house between 4,000 and 12,000 cows. In the past 3 years, PG&E’s Savings By Design new construction program has provided design assistance and incentives to approximately 40 new dairies. In the past year alone, 16 new mega-dairies have requested permits in Kern County.

Recently, Southern California Edison developed an Energy Utilization Indices (EUIs) for dairy energy benchmarking. The results found that in benchmarked dairies, energy per cow varied from an efficient 300-400 kWh/cow-year to an inefficient 1500 kWh/cow-year in less efficient operations. (For a 12,000 cow dairy, this could make the difference between being a 4,800,000 kWh/year to an 18,000,000 kWh/year dairy). Typical Farm EUIs vary greatly depending on farm size, method of housing and milk harvest, utilization of energy conserving technology and extent to which environmental factors (lighting, ventilation/air circulation, waste and material handling) are modified through the use of electric technologies.

Energy use in dairies is approximately as follows:



California dairies have been targeted in recent years by PG&E, SCE and third party energy efficiency programs; however those programs have primarily cherry picked specific technologies, such as putting VFDs on vacuum pumps. There is still potential for retrofits and improvements through new construction interventions, especially in the areas of refrigeration/milk cooling, motors (for water and waste handling), ventilation, and lighting.

Distributed Generation and Demand Response Opportunities: Self-generation, specifically methane biodigesters, solar and wind are ideally suited for dairy farms. Bio-digesters utilize methane gas, typically flared or released into the atmosphere as a greenhouse gas, as fuel for onsite process heating and/or electricity generation. Additional non-energy benefits associated with bio-digesters include a reduction of odor and liquid waste disposal problems, pollution reduction in one of the country's most highly polluted basins, and the ability to use of remaining solids for fertilizer. Photovoltaic electric generation is also a good opportunity. Dairies, with large roof areas for shades and barns, could be easily equipped with PV panels to produce electricity for lighting or ventilation needs. Wind turbines can also be erected if wind resources are reliable in the dairy's location. The Agricultural and Food Processing Program will work closely with internal groups, such as PG&E's Self Generation Incentive Program, to integrate self generation into project analysis and planning. Further education for dairymen and dairy suppliers on energy efficiency and self-generation technologies, programs and participation requirements is needed.

Demand response is not ideally suited for the dairy market as dairy facilities are typically 24 hours/day operations. However, certain options should be evaluated, such as the ability to "float" milk refrigeration loads through peak periods, shifting production hours to off peak periods, and installing controls to facilitate demand reduction. Other options to consider include thermal energy storage for refrigeration and using well storage tanks to shift water pumping off-peak

#### Barriers

- Dairies have thin margins and capital constraints
- Slow technology transfer from other industries
- Lack of awareness about the full spectrum of available resources such as utility efficiency and demand response programs and federal loan and grant programs
- Lack of information about on available or emerging technologies, and potential savings from projects

Effective, integrated demand side management for the dairy segment requires an consistent, long-term involvement through both centralized and local interventions, education and training for dairy operators and the design and engineering community, incentives, and locally or community-based technology demonstrations. The segment requires experts familiar with the dairy facilities, their business cycles, and their

operations, as well as with the appropriate energy efficiency options. Current market expansion and upgrade of dairies present a great opportunity to tap energy savings but demand a close existing working relationship in order to be ready during the small windows of opportunity when customers can introduce higher-efficiency technologies and practices. PG&E has been working with the dairy market for many years and has established working relationships with market allies, however there is potential for additional partnering with the statewide utilities, local, state, and federal agricultural groups, air quality management boards, water agencies, and third parties familiar with the dairy market.

### **Food Processing**

Food Processing Market Characterization: Food Processing includes wineries, meat and poultry processing, non-cheese dairy products, cheese manufacturers, canned fruits and vegetables, dried fruits and vegetables, frozen fruits and vegetables, grain products, baked goods, sugar and confectionary products, oils, snack manufacturing, soft drink manufacturers, and seafood processing. Wineries, one of PG&E's largest food processing customer categories, are described separately as a specific sub-market.

3,600 PG&E food processing accounts consume about 2,400 GWh annually. Unlike the agricultural irrigation segment, the food processing segment is dominated by a small number of large customers. The top 3 percent of food processors (representing 121 customers) consume two-thirds of the electricity and account for 57 percent of the peak demand.

Of these, the top six electricity users include wineries (16%), canned fruits and vegetables (11%), natural, processed and imitation cheese (7%), dehydrated fruits (6%), vegetables, soups, frozen fruits and vegetables (6%).

The largest natural gas users among food processors are canned fruits and vegetables processors, dehydrated fruits and vegetables, soup processors, dairies, frozen fruits and vegetables, and beet sugar.

This relatively mature industry segment has high energy-intensity. Energy bills are large and significant in comparison to profit margins. The fruit and vegetable industry's energy use is also highly seasonal, with 80% of natural gas and 60% of electricity being consumed during the peak summer season. Mature markets facing increased competition, particularly global competition, are primed to reduce their energy use through PG&E's programs if barriers can be overcome. The potential 10-year electric and gas savings from energy efficiency in food processing equals approximately 265 GWh and 75 Mtherms. The majority of these savings come from process system improvements, as seen below.

**Projected Electric and Gas Savings over 10 years for Food Processing**

<b>ELECTRIC</b>	
· Process (motors, compressed air, refrigeration)	<b>77%</b>
· Lighting	<b>13%</b>
· HVAC	<b>10%</b>
<b>GAS</b>	
· Improved boiler efficiency	<b>94%</b>
· Improvements to process heating systems	<b>6%</b>

Distributed Generation and Demand Response Opportunities: There are opportunities for distributed generation and co-generation at food processing facilities utilizing waste heat/steam for production processes such as pasteurization, cooking and heating. Additionally, food processors have shown a high level of interest in demand bidding programs (DBP). The Agricultural and Food Processing Program will work closely with internal groups such as the Self Generation and Incentive Program (SGIP), the Distributed Generation Program (DG), and the Demand Response (DR) Program to coordinate integrated program services for food processors. Detailed opportunities are described in Section 10.

Non Energy Benefits: Non-energy benefits in the food processing sub-market are numerous, and will be evaluated, quantified where possible and communicated to customers through audits, project analyses, program marketing and collateral, and through educational and outreach efforts. They include benefits such as water reduction (which has related energy implications), product quality improvements, increased facility automation, food safety improvements, improved market competitiveness, and “green” marketing power. Many larger food processors are increasingly committed to sustainable business practices - energy efficiency is a natural component of these sustainability efforts.

Barriers

- Concerns over cost competitiveness in an increasingly global food products market overrides the sustained long-term focus on energy efficiency required to maintain continuous improvement in energy use.
- Few firms are able to maintain facility level energy managers, even at their largest facilities.
- Short-term survival attitudes continually push efficiency improvements that could improve competitiveness into the future.
- In the struggle for corporate capital resources for process improvements in a highly cost competitive industry, the return from energy efficiency action items does not place them at or near the top of the list of accepted projects.
- Mandates to meet regulatory requirements (air and water quality in particular) may crowd out energy efficiency improvements.
- Even large, sophisticated food processors have doubts that efficiency improvements will perform adequately and lead to real long-term cost reductions.

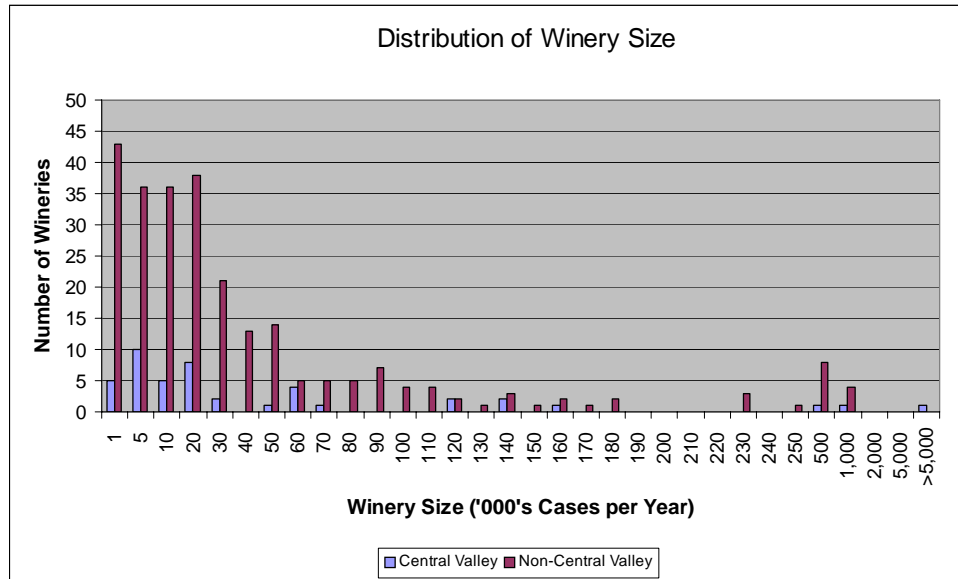
- Lack of education and information on how to operate certain systems optimally and efficiently, such as compressed air and refrigeration systems
- Lack of appropriate technology transfer from other industries that might serve food processors well.
- Need for technology demonstrations

Energy efficiency adoption for the food processing segment requires a consistent, long-term involvement with customers to plan integrated energy management strategies. Delivery will include access to customers through assigned PG&E Account representatives and marketing through multiple partnerships. PG&E will work with multiple groups to align program offerings with industry R&D and educational efforts underway, including with California Institute for Food and Agricultural Research (CIFAR), California League of Food Processors, Farm Information and Advisory Center (FIAC), CEC, UC Davis Food Processing and Viticulture/Enology programs, the Western U.S. Food Processing Efficiency Initiative (STAC), and others. Industry consultants with extensive food processing experience will provide onsite and investment grade audits, as well as technical project support for planned new construction and retrofit projects and long range project planning. PG&E will help coordinate technology demonstrations at customer facilities, in partnership with the CEC and other food processing partners engaged in energy efficiency efforts. PG&E and third parties will provide both targeted and crosscutting education and training for both facility operators and the design and engineering community.

### **Wineries**

Wineries Market Characterization: California produces 90% of total US wine production, which has tripled over the past 20 years. California has over 1100 wineries that produce 500 million gallons of wine per year and contribute about \$33 billion to the state's economy. Energy consumption in this sub-market is large - over 400 GWh of electricity per year - making it the largest consumer of electricity in CA's food industry. Winery energy consumption is generally concentrated during the summer/fall crush when energy costs are highest and demand response needs greatest.

Approximately 750 wineries fall within PG&E's territory. While the counties of Sonoma, Napa, Lake and Mendocino contain the overwhelming majority of these wineries, which tend to be predominantly small accounts, the largest wineries producing bulk wine are in the Central Valley. Approximately 60% of the 2002 crush occurred in State Crush Districts 11-14, which include Lodi/Woodbridge, Stanislaus/Merced, Fresno/Madera/Tulare and Kern Counties.



**A motivated market:** California wineries are highly motivated to address energy management and energy efficiency issues as they are related to cost reductions and as it is a critical component of statewide sustainability efforts in the industry. Wineries place a high value on reputation and marketability, and are particularly motivated by efforts to be “green” and sustainable. In addition to soil management, water reduction, organic grape farming and watershed management, wineries recognize the important role of energy efficiency and distributed generation as part of their portfolio of activities. In a recent survey of over 800 facilities conducted by the California Sustainable Winegrowers Initiative, improving energy management was listed as a top priority.

Wineries typically have a single point of contact that makes decisions regarding equipment purchases and operations and maintenance, providing a simplified customer interface for this sub-segment. These decision makers have reported a desire for better understanding their energy use and consumption, energy savings potential, and lifecycle costing and ROI information. However, as this market is highly seasonal, it is important that these energy management interactions occur during non-crush months.

**Energy Characterization:** Facility energy use is heavily oriented towards refrigeration and process systems, including motors and pumps related to receiving, draining, dejuicing, decanting, pressing and wastewater treatment, as well as compressed air utilities and hot water heating. Individual wineries vary widely in energy use depending on the type of wine produced, climate zone of the winery and source of grapes (which effects temperature and cooling), and scale of production. A large industrial winery might have an energy use breakdown as follows:

- Ammonia Compressors 50%
- Pumps 27%
- Evaporative Condensers 10%
- Air Compressors 5%
- Harvest Equipment 5%
- Lighting 2%
- Miscellaneous 1%

Potential energy savings in wineries are significant, especially in the area of refrigeration improvements and controls. For example, adopting electro-dialysis for cold stabilization of wine is estimated to save wineries up to 34% of energy related to that process. Specific energy efficiency technology opportunities are further discussed in section 10.

Non-energy benefits: Non-energy benefits associated with energy efficiency improvements in wineries include better process control, improved product quality, peak load reduction, water reduction, and environmental sustainability marketing benefits, which are important to the winery industry.

Barriers

- Difficult to convince corporate decision makers to invest in energy efficiency without quantifiable data
- Smaller wineries often insist on a payback period of 2.5 years or less
- Wineries are sensitive to aesthetic impacts of energy efficiency measures such as wine tank insulation

PG&E will present an integrated DSM package of program services to wineries under the title of “Sustainable Wineries Energy Benchmarking and Management.” This effort is being proposed as a pilot in 2005. The implementation strategy builds upon a network of existing PG&E partnerships and industry sustainability efforts to offer a coordinated, market-specific approach to promoting sustainable energy management in California’s wineries and related vineyards. These partnerships, strategies, roles and responsibilities are described in more detail in Section 10.

**Refrigerated Warehouses**

Refrigerated Warehouse Market Characterization: There are approximately 600 refrigerated warehouses in PG&E’s territory, including public and private refrigerated warehouses, food and beverage processors, and perishable product cooling and packaging operations. As a group, refrigerated warehouses consume approximately 660 GWh and 227 MW per year. Refrigerated warehouses are spread throughout the territory, but are particularly concentrated in agricultural counties and regions, as well as on shipping corridors such as routes 5 and 99, some of California’s hottest climates. Because refrigerated warehouses handle a wide variety of seasonal fruits, vegetables

and manufactured products throughout the year, loads can vary dramatically between facilities.

In recent years, PG&E has had good success with energy efficiency efforts in refrigerated warehouses with both system-based retrofits in the Standard Performance Contract Program, as well as through providing customized design support and incentives for integrated system expansions and new construction through the Savings By Design Program. While SPC has used a system based calculated approach to energy savings, SBD consultants have utilized modified DOE2 software to conduct whole system analyses and custom-model energy performance enhancements for specific refrigerated warehouse loads and conditions.

Barriers:

- There is a lack of education and training in the industry for facility operators on optimal operations, maintenance, and opportunities for system retrofits. As a result, refrigerated warehouses are typically operated at sub-optimal conditions.
- Large users of industrial refrigeration require accurate project-specific savings estimates and performance targets, and project economics in order to obtain corporate funding for energy efficiency projects.
- Capital required for facility upgrades and retrofits is significant.
- Large complex refrigeration systems require commissioning and retro-commissioning
- Operators typically lack system monitoring to track real time system component performance.

Demand Response Opportunities: Product and load schedules impact a facility's ability to participate in demand response. Different food products have the capacity to adjust in temperature without effecting product quality, and there are CEC studies being conducted to investigate those opportunities. Some facilities can "float" through peak demand periods and shift refrigeration loads. Other opportunities include aggregating with other cold storage facilities in order to divide the curtailment period, and pre-cooling for demand response when a day-ahead notice is provided. Refrigerated warehouses are large energy users that meet threshold load criteria for the majority of planned demand response program efforts. With attention paid to their specific operational needs, PG&E expects that refrigerated warehouse customers will be active partners in CPA and PG&E Demand Response programs.

PG&E's refrigerated warehouse program utilizes a combination of assigned PG&E account representatives, industry experts, vendors, and third parties to deliver a coordinated set of services to the industry, including education and training throughout the territory and at refrigeration conferences, on site facility audits, design assistance for new construction and retrofits, project modeling in DOE2 software to provide accurate savings and economic forecasting, real time monitoring of system performance after project completion, and project incentives to provide adequate payback scenarios to facility owners.

7. Program Outcomes

The major outcome of the program is to meet the energy savings target set for the Program and identified above in Section 2. Beyond those kW, kWh, and therm savings targets, PG&E has the following non-energy outcomes for this Program:

- Single point of contact: Provide a single point of coordination and contact for Agricultural and Food Processing customers. Work with these customers to help them access all energy efficiency products and services available through PG&E.
- Reduce Confusion and Barriers to Participation: Reduce customer confusion through appropriate alignment of PG&E marketing materials with other applicable programs such as Education, Training, and Outreach, Codes and Standards, Emerging Technologies, and the Mass Market Program.
- Optimize New Construction: Ensure that the full complement of energy efficiency measures that could be employed in the Agricultural and Food Processing markets in new construction or facility expansions/renovations are considered and not discarded due to a lack of information, faulty planning, or other actions that can be influenced by PG&E and other industry energy efficiency experts.
- Integrate energy efficiency into standard practice: Motivate customers and design industry professionals to integrate energy use and environmental considerations into their standard process of design to achieve cost-effective levels of energy and resource efficiency.
- Optimize existing facilities: Help Agricultural and Food Processing facilities customers save energy by increasing the efficiency of their existing systems.
- Educate customers, designers, and vendors on existing and emerging technologies: Influence customers to change energy practices by providing education, training and information to familiarize the customers and their contractors, designers and consultants with new energy efficiency equipment and practices as they are developed for the industry.
- Facilitate Technology Transfer: Use existing technologies in new applications or among industry groups that have very low technology adoption rates. (For example, refrigerated warehouses are an untapped market for cool roofs and system control enhancements). PG&E will initiate demonstration projects that promote the use of relatively new technologies within market segments that have not yet adopted the technology.
- Align programs with existing local, state and federal efforts: Support industry trends and developments, such as tools and trainings offered through the DOE's Office of Industrial Technologies (i.e., Compressed Air Challenge or Motor Decisions Matter), emerging technologies work at the CEC, agricultural sustainability movements, and other collaborative relationships to support a fully

integrated portfolio of relevant programs, tools and information for Agricultural and Food Processing customers.

- Promote energy efficiency trade allies: Provide continuous education, training, tools and resources to the large community of vendors and trade allies in California that are critical to delivering energy savings.
- **MI DSM:** Work with internal PG&E groups including the Self Generation Incentive Program and the Demand Response Program to coordinate the full spectrum of Market Integrated Demand Side Management (MI DSM) elements into program designs.

## 8. Program Strategy

The overall program strategy is to increase agricultural and food processing customer participation in the full menu of energy efficiency interventions by reducing market barriers through coordinated multi-channel program delivery mechanisms for traditional and non-traditional incentive structures. This will be accomplished by focusing on the customers' business needs, while continuing to address the energy component of the business model.

The market integrated demand side management approach will both encourage and enable much closer working relationships with both customers and with industry experts. Closer relationships with industry experts and local agricultural organizations are essential given the size of this market and given the customers traditional reliance on local organizations for advice and counsel.

Early intervention during the design stage by the specialized engineers, contractors and consultants who serve these industries in the construction and renovation of facilities is especially important. PG&E intends to maintain close contact with the largest food processors, wineries and dairies that will comprise most of the facility constructions and renovations.

This program will first focus on business owners, industry consultants, and trade groups representing the various facets of the industries. Additional focus will be placed on the specific market types within this group (e.g., greenhouses, dairies, and refrigerated warehouses) and by crosscutting systems and technologies (e.g., irrigation pumping, refrigeration, water and space heating).

PG&E and third party market experts will provide Calculated and Deemed savings options as well as audits, self-generation information, demand response and education and design assistance on the latest developments for managing energy.

By combining previously stand-alone programs offerings into one vertical market segment, oriented to the unique needs of the target customers within it, gaps and overlaps that existed between program elements can be resolved, resulting in a much

more effective approach. Program administrative costs can also be reduced by achieving economies of scale and by combining systems and staff functions. Wherever possible, PG&E will strive to deliver Agricultural and Food Processing program elements that are consistent on a statewide basis. PG&E will also work to adopt “Best Practices” from similar national IDSM programs. The following portfolio of products and services will be coordinated for target market segments:

1. **Education and Training.** The Agricultural and Food Processing Program will coordinate information, Education, and Training activities to best meet the needs of the market. Information and Training activities, especially early in the implementation of a new program, are critical to lay the groundwork for customer investments in energy efficiency and energy management.

The Program manager and assigned team will serve as a conduit to give strategic direction to Information and Training Programs for target markets, and will act as a continuous feedback loop for ongoing program refinement. The integrated Information and Training resources will include:

- a. Energy Audits: On-site and other audit activities associated with the Nonresidential Audits program will be an element of the Agricultural and Food Processing Program. Pump Testing will be an element of Energy Audits
  - b. Benchmarking (by customers and by target industry): Benchmarking and self assessment tools will be adopted or developed wherever for target market segments, as an informational, motivational and strategic tool for customers and utilities
  - c. Commissioning and Retro-Commissioning: Design assistance and on-site evaluations and activities may be available, as appropriate, to the Agricultural and Food Processing customers to ensure that energy efficiency equipment functions as intended (e.g., for refrigerated warehouses)
  - d. Codes and Standards (or industrial Best Practices): While the most significant Agricultural and Food Processing loads are not covered by Codes and Standards, PG&E will work to support the adoption of industry-specific and crosscutting technology “Best Practices”
  - e. Emerging Technologies and Technology Demonstrations – Target ET and demonstrations for Agricultural and Food Processing target customers will be delivered to the market through this integrated program
  - f. PG&E’s Information Clearinghouse: PG&E’s Web- and phone-based Information Clearinghouse will serve as a central, one-stop shop to deliver Agricultural and Food Processing Program information and services. It will also coordinate relevant non-PG&E tools and resources that are relevant to the market (financing, grants, etc.)
2. **Deemed Incentives.** The Agricultural and Food Processing Program will assemble and deliver market-targeted information on PG&E’s Deemed incentives and rebates. The Deemed Incentives component is not expected to be a significant

portion of the Agricultural and Food Processing Program savings delivery, as the Calculated approach will better reflect energy savings from unique systems or varying hours of operation. Design assistance service will also be offered in conjunction with Deemed incentive options, as appropriate.

3. **Calculated Incentives.** The Calculated approach will offer calculated incentives for more complex or customized Retrofit and New Construction Projects, and will provide technical design assistance for customers. Program collaterals, offerings and incentive rates will be aligned with statewide programs “Savings By Design” and “Standard Performance Contract” to the extent possible.
4. **Demand Response.** The Agricultural and Food Processing Program will coordinate activities with internal Demand Response Programs to integrate DR program offerings, and opportunities to better serve the customer.
5. **Distributed Generation.** The Agricultural and Food Processing Program will coordinate activities with internal Distributed Generation (DG) Programs to integrate DG technologies and program offerings, better serve the customer, and minimize missed opportunities.

The Agricultural and Food Processing Program will utilize a team of experts and industry professionals, varying by sub-market segment, to deliver energy efficiency services to the customer. This team of experts will consist of market-dedicated PG&E employees, external consultants with market expertise, and third parties who may deliver components or whole sub-markets of the Program. Vendors may also deliver energy savings as project “sponsors” through the Calculated approach, or through the Deemed incentive options. PG&E will remain the primary point of contact to coordinate the various program elements described above. Dedicated PG&E Program representatives will meet regularly with larger assigned Agricultural and Food Processing customers, as well as with program partners and industry groups, to provide a continuous feedback loop required to track and adjust the Program as necessary.

As discussed above, the Agricultural and Food Processing Program will employ primarily the Calculated energy savings incentive mechanisms. Because there is growth in some but not in the majority of agricultural and food processing sub-segments, it is estimated that the energy savings will be derived primarily from retrofit energy savings.

Budgets and goals described above account for the Calculated savings associated with the Program potential. Budgets and goals for Deemed Savings and most Education and Training Programs have been accounted for in the Mass Market and Education and Training Program Filing components.

Government Partnership Programs ("Partnerships") may be funded by this market segment. Each Partnership will focus on the markets that offer the greatest opportunity for energy savings in their jurisdiction. A market-based approach is optimal for this

segment because local governments are in the best position to understand the needs of local industries, business, and institutions. This approach will blend the benefits of common programs and strategies from a Statewide Program strategy with the local knowledge of markets and barriers to traditional energy efficiency programs.

Such partnerships may be particularly productive in delivering agricultural and food processing programs where there are existing local government initiatives for pollution reduction or water conservation that dovetail well with energy efficiency efforts.

PG&E will also coordinate the energy service options with other applicable demand side options to help the customer develop a comprehensive energy plan for the company.

#### 9. Program Objectives

The primary objectives of the program are to meet the energy goals associated with the program. The program-specific energy savings goals (for the calculated component) are provided above in Section 2.

Additional objectives, described in Section 7, Program Outcomes, support the long-range sustainability of integrated DSM as a procurement strategy.

#### 10. Program Implementation

Program design details, marketing and implementation strategies, target technologies and opportunities, target goals, and partners/stakeholders vary by industry sub-market and are described below for the Agricultural, Dairy, Food Processing, Wineries, and Refrigerated Warehouse sub-markets.

The services available to this market segment are as varied as the customers included. For that reason, PG&E will develop a Clearinghouse which will assist customers to define services that they may need at the present stage of their projects as well as introduce them to services that will be available as they complete each stage of their long term energy plans. For instance, a customer may call with questions about distributed generation but may not have considered some of the available energy efficiency upgrades that could reduce the size of a future distributed generation project. Or, a customer interested in demand response options may not have considered HVAC controls that would allow ongoing energy efficiency options as well as demand response.

##### Audit Services

Customers often lack knowledge about identifying energy efficiency opportunities and assessing potential energy and cost savings. Over the years, Audit Services have shown

to be an effective method for delivering energy efficiency information and awareness to customers, and leading to participation in energy efficiency projects.

Integrating Audit Services as part of a coordinated, vertical market segment will provide several advantages. The process of referring audit recommendations to the Agricultural and Food Processing Program delivery channels greatly enhances the current process. Since the vast majority of audit recommendations will be related to measures or process improvements covered under the Agricultural and Food Processing Program, it will be effective and efficient to congregate all the recommendations and then sort and parcel them out to the appropriate delivery channel. This process will also lead to tracking efficiencies. Linking the audit database with the Agricultural and Food Processing Program database will result in improving the tracking of the audit process through the stages of recommendation, lead generation, project implementation and results, and follow-up of non-participation.

Audits for Agricultural and Food Processing customers will primarily be on-site integrated audits and pump tests.

#### Benchmarking

Benchmarking is a valuable motivational tool that serves multiple purposes; On a facility level, benchmarking provides customers a baseline of facility energy use, or equipment energy use, which they can use to plan future incremental improvements. On an industry level, benchmarking allows companies to compare their energy performance (per square foot, per widget produced) to their peers. It also provides a valuable baseline for overall industry performance which PG&E and other entities can use to track overall industry performance improvements. Benchmarking will be utilized in the Winery and Dairy industries, and will be developed in conjunction with partners for the Refrigerated Warehouse facilities. Some food processing sub-markets may also be appropriate for benchmarking.

#### Deemed Savings

Deemed savings rebates offer a simplified process for customers to apply for and receive a 'per-widget' rebate to reduce capital costs of installing higher efficiency equipment or retrofitting inefficient system components. Although Deemed Savings measures are filed separately under the Mass Market Program, the Agricultural and Food Processing Program will coordinate marketing and easy access to these program components incentives for its targeted customers and vendors. Deemed savings measures may be appropriate for certain non-process measures such as lighting and irrigation retrofits. The upstream motors program will be an effective strategy to get efficient motors into irrigation pumping systems. Deemed savings will also be available to some small new construction projects for which calculated savings are not appropriate.

Vendors and trade allies have a long track record of using the Deemed (itemized) approach to sell energy efficient equipment. In many cases, the customer's assurance of receiving a rebate helps to make the sale and the rebate is often signed over to the vendor who lists the rebate amount as a credit on the customer's invoice. This partnership with the vendor community will be further developed and fostered within the Agricultural and Food Processing program.

#### Calculated Incentive

The calculated incentive element pays incentives based on calculated project performance for both new construction and retrofit projects. Offering incentives for the utilization of non-itemized energy efficient measures encourages and supports comprehensive, integrated projects that go beyond single measures and common efficiency practices. The calculated approach for new construction projects also allows for integrated design analysis, capturing interactive savings and potentially minimizing first costs to the customer (e.g. downsizing cooling equipment due to high performance glazing specifications). For non-process measures, Title 24 can be consulted as a comparator for program baselines.

The calculated approach will build upon the tools and resources of the Savings By Design and Standard Performance Contract Programs and, to the extent possible, PG&E's calculated program offerings will be aligned with these existing statewide efforts.

For new construction and major renovation projects, program staff will work to provide information and design assistance as early as the conceptual design stage. Early intervention by specialized engineers, contractors and consultants who serve these industries is especially important because design changes become more costly to the owner later in the design process, and in some cases changes cannot be implemented. Consequently this program will first focus on educating the market and establishing ongoing working relationships with agricultural and food processing customers in charge of capital budgeting and facility development.

Calculated incentives will be determined using building and process energy modeling (based on DOE2 or other appropriate energy simulations) prepared by qualified energy consultants and verified internally or through external consultants. Process systems will be modeled in process modeling software, such as that provided by the Department of Energy (i.e., MotorMaster, ASDMaster), though integrated process system calculations may require more customized treatment. For new construction projects, owner incentives will be paid to new construction projects that beat the baseline by 10%. (For process systems this requirement varies, as 10% is not always achievable, e.g., with motors). Retrofit projects will be paid based on all savings beyond the baseline. Where possible, existing Standard Performance Contract calculators will be modified and expanded to allow for both new construction and retrofit modeling. Design team incentives will be available for both new construction and retrofit projects.

**Agricultural Implementation**

PG&E will implement components of the Agricultural program through Account Representatives, program staff, and technical consultants but will seek third party implementers for certain components, including irrigation pumping. Program elements will include education and training seminars, pump tests, incentives for pump repair and replacement (as well as for new premium efficiency pumps), design assistance and incentives for new construction and retrofit projects, and technology demonstrations.

Agricultural	2006	2007	2008
Pump Related Trainings	50	50	50
Pump Tests	1000	1500	2000
Pump Repair	300	400	500
Other Ag related trainings	3	3	3
Greenhouse NC or Retrofit interventions/projects	20	30	40
Demonstrations	5	5	5
Energy Savings	12 MWh	16 MWh	20 MWh

The energy savings shown above estimate that approximately 40% of customers that receive a pump test will undertake repairs, and that the average savings per pump repair will be approximately 40,000 kWh. The remainder of energy savings will come from non-pump projects, such as greenhouses and other agricultural applications.

Marketing Strategy

The Agricultural Irrigation component will be delivered through traditional marketing channels (assigned PG&E Account Representatives) as well as strategies using a comprehensive network of partners, including:

- farm and agricultural industry organizations
- Local USDA chapters
- the California Energy Commission’s Process Energy Programs
- The Department of Water and Power
- the Center for Irrigation Technology
- Motor and pump vendors

Past records of customer energy efficiency activity, as well as billing records, will help target program opportunities

Education and Training Seminars:

**Pump and Irrigation Trainings:** Customers will be trained on how to specify, operate and maintain efficient pumps, and on related energy efficiency optimization information. Trainings will cover energy efficiency as well as demand response and demand reduction strategies and information. Trainings will be held throughout the state.

Additionally, PG&E will make available crosscutting trainings, such as technology-based trainings offered through the DOE's Best Practices Program, available to all agricultural customers.

Pump Tests and Agricultural Audits

PG&E will coordinate Agricultural Irrigation pump testing activities to be consistent with those offered by Southern California Edison. Agricultural customers will be eligible for pump tests on a cost-share basis, which will provide maintenance and repair information to optimize pump performance. Pumps will be tested using industry-accepted standard pump testing methods. Agricultural customers with non-pumping facilities, such as greenhouses, will also be eligible to receive more traditional audit services to address process and non-process loads.

Incentives for retrofits, repair and new construction/additions

Through information and educational activities, customers will be encouraged to implement retrofits, repairs and other efficiency improvements to existing facilities, as well as to adopt best practices in new construction activities. Deemed and Calculated rebates and incentives will be available.

For pump repairs, calculated rebates will be paid at "process" incentive rates for pump repairs. Deemed incentives will also be available for Deemed irrigation measures such as "sprinkler to drip irrigation". The following is a list of potential target energy efficiency technologies and practices:

- Repair and/or replacement of shaft, impeller and pump bowls
- Installation of pump system controls
- Improvements to water system design to facilitate more accurate pump testing
- Installation of higher efficiency motors
- Conversion of sprinklers to micro-irrigation technology
- Installation of low-pressure sprinkler nozzles

For non-pump agricultural facilities such as greenhouses and other facilities, Deemed and Calculated rebates will be available for the following activities:

- Improvement of building envelope
- Efficiency retrofits to process heating systems
- Lighting and ventilation efficiency improvements

Target Demand Response and Reduction Opportunities

- Turn off all nonessential pumping equipment
- Use pumping controls
- Adjust irrigation schedules to non-critical hours, particularly nighttime

- Operate additional pumps, if available, after curtailment to make up the required water quantity

Target Distributed Generation Opportunities

- Solar powered pumping
- Wind turbines for pumping

Irrigation Demonstration Opportunities

- Mobile Demonstration Lab
- Sprinkler to drip
- Mobile Renewable Pumping lab

**Dairy Implementation**

PG&E will implement the Dairy sub-market component with in-house resources as well as with EnSave, a third part partner. Elements will include dairy-specific integrated education and training seminars, dairy farm audits, dairy benchmarking, incentives for dairy retrofits and new construction performance improvements over standard practices, and technology demonstrations. EnSave will be focusing on promoting five specific measures to dairies. Those measures are: milking vacuum pump variable speed drives, plate coolers, compressor heat recovery units, milk transfer pump variable speed drives, and scroll compressors.

<b>Dairies</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Integrated Dairy Trainings	4	4	4
Dairy Audits	50	100	150
Dairy Benchmarks	100	100	100
Dairy Retrofits – Calculated or Deemed	50	75	75
Dairy New Construction or expansion projects	15	10	10
Technology Demonstrations	5	6	7
New Case Studies	3	2	1
Energy Savings	14,000,000	13,500,000	13,500,000

For energy savings estimates above, it is estimated that the average energy savings from a dairy retrofit is approximately 100,000 kWh, and the average energy savings from a new construction intervention is approximately 600,000 kWh. It is expected that new construction in dairies will slow down over the next three years.

Marketing Strategy:

PG&E will use traditional marketing channels (assigned PG&E Account Service Representatives) and an analysis of past program participants to target program marketing. In addition, PG&E will partner with the following to deliver program information and services to dairies:

- Dairy industry organizations and cooperatives
- Dairy websites, newsletters and magazines
- Local community based organizations, local government agencies, and Local Government Initiatives
- The Farm Bureau
- EPA regional offices
- California Energy Commission related programs
- Air Quality Management Boards
- Water agencies
- Potential Third Parties

Customer billing data as well as analysis of customer targeted in the past will help identify program opportunities.

Information, Education and Training Seminars:

Education and training for dairies will consist of integrated dairy workshops, seminars at agricultural conferences, and the availability of crosscutting technology classes delivered at the Stockton Training Center, SCE's Ag Tac center as well as in other targeted counties in the territory.

- Integrated education and training seminars will cover energy efficiency, demand response and reduction and self-generation opportunities
- Short integrated seminars will be coordinated to be held at a-specific conferences in order to reach the target audience as efficiently as possible
- Crosscutting technology classes (such as on pumping or motors) will marketed to dairies along with other customers
- Best Practices Guidelines, design briefs, and case studies
- Customers often lack knowledge or resources to identify and implement energy efficiency opportunities, successful design strategies or new technologies or to assess potential energy and cost savings in new construction or major renovation projects. Offering project specific energy design assistance has been shown to be an effective method for delivering energy efficiency information to customers and helps to leverage additional savings through the interactive effects identified in integrated design. Additionally, the Program will use the well established EDR to develop new design briefs, case studies and design tools for designers and owners of medical facilities.

- PG&E will partner with SCE to deliver of other educational materials and resources, such as their Dairy Farm Energy Management Guide, and their benchmarking efforts.

#### Dairy Retrofits and Incentives

Dairy customers will be provided project support and both Calculated and Deemed financial incentives to undertake energy efficiency projects targeting the following efficiency improvements:

- VFDs on vacuum motors, milk pumps, irrigation pumps, chilled water pumps, and condensor/precooler water pumps.
- Efficient water heating
- Milk pre-cooling with well water
- Refrigeration head pressure control
- Use of close-approach heat exchangers
- Waste heat recovery
- Use of efficient HID technologies, T8s, natural daylighting and controls
- Premium efficiency equipment when retrofitting gas pumps per AG-ICE
- HVLS ventilation, or use of high efficiency fans
- Efficient design and operation of compressed air systems, or replacement of compressed air with other more efficient options for processes
- Efficient design or retrofits for on site wastewater treatment systems

#### Target Demand Reduction

- Evaluate the ability to “float” milk cooling refrigeration loads through peak periods
- Evaluate options for thermal energy storage for refrigeration loads
- Evaluate the use of well storage tanks to shift water pumping off peak
- Planned shift in refrigeration loads on critical peak days
- Consider shifting production hours to earlier or later in the day, especially with day-ahead notice.
- Shut down product and ancillary equipment, including pumping, lighting, air compressors, and ventilation.

#### Target Distributed Generation Technologies

- Methane Digesters for generation or cogeneration
- Solar pumps for water irrigation or sludge pond aeration
- Solar water heaters for dairy hot water production
- Wind powered irrigation for dairy agricultural fields

#### Dairy Demonstration Opportunities

- Use of evaporative condensers for dairy refrigeration systems
- HVLS fans versus standard fans
- Methane Digesters

- Solar pumps for various uses
- Wind Turbines
- Use of storage tanks for water pumping to shift load
- Use of thermal energy storage for dairy refrigeration

**Food Processing Implementation**

PG&E will implement the Food Processing sub-market component with in-house and contracted resources, as well as three third party implementers, VaCom Technologies, Onsite Energy and PowerLight. Elements will include food processing-specific integrated education and training workshops, onsite and investment grade facility audits, incentives for facility retrofits and new construction performance improvements over standard practices, and technology demonstrations. PG&E will integrate program plans and strategies with numerous food processing initiatives underway.

<b>Food Processing</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Integrated FP Trainings	5	5	5
FP Audits	30	40	40
FP Retrofits – Calculated or Deemed	20	30	40
FP New Construction or Expansion Interventions	20	30	40
Technology Demonstrations	5	6	7
New Case Studies	3	2	1
Electric Energy Savings	10 MWh	15 MWh	20 MWh

The energy savings above reflect an estimate that both food processing retrofits and new construction interventions will average 250,000 kWh per project. Considerable therm savings will also be achieved in the food processing sector.

Marketing Strategy and Partnering Strategy:

PG&E will use traditional marketing channels (assigned PG&E Account Service Representatives) and an analysis of past program participants to target program marketing. More importantly, PG&E will link objectives and strategies with the following groups and resources in the design and implementation of food processing program elements.

- The California League of Food Processors, who represents the majority of fruit and vegetable processing facilities in California
- The California Institute for Food and Agricultural Research (CIFAR) out of UC Davis, who have developed a road map for food processing energy efficiency R&D objectives and who have valuable industry contacts. Also, the related Food Industry Advisory Committee (FIAC), an advisory group that includes utilities, UC Davis, food processing industry customers, and the CEC
- The UC Davis Food Processing and Viticulture/Enology programs, which educate the world leaders in food processing and winemaking
- The California Energy Commission, who is operating grants for food industry research and development

- The Western U.S. Food Processing Efficiency Initiative (Oregon, Washington, California, and Idaho), a collaborative aimed at collecting a definitive body of knowledge on water and energy efficiency in food processing, and providing guidance to participating states and industry groups on implementation strategies.
- Local community based organizations, local government agencies, and Local Government Initiatives as appropriate
- EPA regional offices, Air Quality Management Boards, and Water agencies as appropriate
- California Energy Commission related programs
- Potential Third Parties.

Education and Training Seminars:

- Integrated EE/DG/DR trainings that will target canners, dehydrators and packers separately.
- DOE Best Practices classes on motors, pumps, VFDs, compressed air will be marketed heavily in food processing areas
- Short workshops will be coordinated for delivery at food processing conferences, such as the California League of Food Processors conference.

Food Processing Retrofits, New Construction interventions and Incentives

Food processing customers will be provided project support and both deemed and calculated financial incentives to undertake energy efficiency projects targeting efficiency improvements in new construction and retrofits of facilities. Energy and non-energy benefits will be stressed.

- Industrial process system optimization
  - Compressed Air
  - Motors
  - Pumps
  - Refrigeration
  - Water efficiency
- Efficient boilers and chillers
- Lighting retrofits with demand reduction and response controls
- Improve and maximize efficiency of fruit and vegetable dryers and dehydrators
- Industrial water reduction - reduces energy used in pumping and wastewater treatment
- Use of membrane cross-filtration to reduce wastewater
- Meters and controls for real-time equipment monitoring and evaluation
- Automation for precision temperature control
- Replacement of mechanical processes with bio-based processes
- Efficient separation technologies
- Efficient wastewater treatment processes, such as fine bubble aeration and use of efficient motors

Targeted Demand Reduction and Response

- Staged controls on lighting, HVAC and other non-process building measures
- Float refrigeration systems through peak periods
- Shift production to off peak hours as standard practice or with “day ahead” notice

Target Distributed Generation and Cogeneration Opportunities

- Waste heat recovery
- Cogeneration
- Investigate the use of food waste products for biomass generation

Target Demonstrations

- Numerous demonstration opportunities exist. PG&E will work with STAC, CEC, CIFAR, CLFP and other important industry players to identify the best use of program resources or funds regarding demonstrations

**Winery Implementation**

PG&E will implement the Winery sub-market component with in-house, contracted resources and third parties. Both PowerLight and D&R International are third party partners who will be providing services in this segment. PowerLight will be pursuing their combined photovoltaic and energy efficiency approach, while D&R International will be assisting small and medium wineries and growers with turnkey projects.

PG&E will present an integrated DSM package of program services to wineries under the title of “Sustainable Wineries Energy Benchmarking and Management.” This element is being proposed to the CPUC as a pilot in 2005 and, if successful, will be expanded in 2006-2008. The implementation strategy builds upon a network of existing PG&E partnerships and industry sustainability efforts to offer a coordinated, market-specific approach to promoting sustainable energy management in California’s wineries and related vineyards. Elements will focus on integrating program strategies with existing successful industry efforts underway, including the LBNL winery benchmarking tool, the California Sustainable Winegrowers Initiative, water efficiency efforts, the Agricultural program (focusing on pumping efficiency), the CEC, and others. Program elements will include integrated winery workshops and classes, customer and industry benchmarking, audits, technical support and incentives for new construction and retrofits, and possibly demonstrations.

<b>Wineries</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Integrated Winery Trainings	10	15	15
Winery Audits	50	75	100
Winery Benchmarks (LBNL’s)	100	100	100
Winery Retrofits	30 – 6m	40 – 8m	50 – 10m

Winery NC or Expansion interventions	20 - 3	25 – 3.75	30 – 4.5
Technology Demonstrations	3	3	3
New Case Studies	5	2	1
Energy Savings	9 MW h	11.75 MWh	14.5 MWh

The energy saving above estimate that the average energy savings from a winery retrofit is approximately 200,000 kWh and new construction intervention is approximately 150,000 kWh

Marketing:

Marketing for the winery program will involve assigned PG&E Account Services and other resources, using past customer participation and customer billing information to target high potential projects, and will involve partnerships with the following to align and market program services and offerings:

- Wine industry websites, publications
- CEC and LBNL benchmarking outreach
- California Sustainable Winegrowers Initiative
- The Wine Institute
- Local winery industry organizations, such as the Napa Valley Vintners Association
- Local community based organizations, local chambers of commerce, local government agencies, and PG&E's Local Government Initiatives, as appropriate
- EPA regional offices, Air Quality Management Boards, and Water agencies as appropriate
- California Energy Commission related programs in agriculture
- UC Davis Viticulture and Enology Programs
- CIFAR at UC Davis

Education and Training:

- Integrated EE/DG/DR trainings will target winery and vineyard operations in all winery regions in PG&E's territory
- DOE Best Practices classes on motors, pumps, VFDs, compressed air will be marketed to winery customers as crosscutting educational elements
- Short workshops will be coordinated for delivery at winery industry association conferences and gatherings to reach the target audience efficiently
- Best Practices Guidelines, design briefs, and case studies
- Customers often lack knowledge or resources to identify and implement energy efficiency opportunities, successful design strategies or new technologies or to assess potential energy and cost savings in new construction or major renovation projects. Offering project specific energy design assistance has been shown to be an effective method for delivering energy efficiency information to customers and helps to

leverage additional savings through the interactive effects identified in integrated design. Additionally, the Program will use the well established EDR to develop new design briefs, case studies and design tools for designers and owners of medical facilities.

Audits and Benchmarking

- On site audits will be provided to wineries, and pump testing services to associated vineyards through the Agricultural element, upon request, delivered by industry expert consultants. Large wineries will continue to be targeted for integrated audits.
- PG&E will support the dissemination and use of LBNL's BEST Winery Benchmarking tool, which is being disseminated at no cost to all California wineries. PG&E will make technical support available to customers in the benchmarking process
- PG&E will use aggregated winery benchmarking results to develop an overall industry benchmark from which to continuously improve program offerings and industry performance

Winery and Vineyard Retrofits, New Construction interventions and Incentives

Winery and Vineyard customers will be provided project support and Deemed and Calculated financial incentives to undertake energy efficiency projects targeting efficiency improvements in new construction and retrofits of facilities and systems. Energy and non-energy benefits will be stressed.

- Use of NEMA premium motors
- Use of VFDs on vacuum pumps
- Refrigeration system improvements and controls
  - High efficiency ammonia compressors
  - Reciprocating compressors
  - Sequence evaporative condensers
  - Float head pressure
  - Insulate wine transfer lines
- Wine tank insulation
- Improved building insulation
- Compressed air system improvements and controls
- Lighting retrofits, daylighting, and controls
- Use of naturally cooled caves for barrel storage
- Efficient pumping for vineyards

Self Generation Opportunities

- Wind turbines
- PV systems

Demand Response and Reduction Opportunities

- Off peak chilling
- Off peak vineyard irrigation

- Shut off or float refrigeration loads during peak periods
- If possible, stop product or ancillary equipment including lighting, motors and
- Shift production hours to earlier or later in the day, especially with day-ahead notice

**Refrigerated Warehouses Implementation**

PG&E will implement the refrigerated warehouse sub-market component using primarily third party resources to deliver comprehensive program services. VaCom Technologies and Onsite Energy will both be playing major roles in this area. However, vendors will still be able to deliver retrofit energy savings as project sponsors through the Calculated approach.

The comprehensive program offerings for refrigerated warehouses will include industry education and training, facility audits and evaluations, design assistance and incentives for new construction and retrofits, project modeling in whole system energy modeling software, energy performance monitoring, and demonstrations.

<b>Refrigerated Warehouses</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Integrated RWH Trainings	5	5	5
RWH Audits	20	30	40
RWH Retrofits	20	25	25
RWH NC or Expansion Interventions	20	25	25
Technology Demonstrations	3	3	3
New Case Studies	3	3	3
Energy Savings	20 MWh	25 MWh	25 MWh

The energy saving above estimate that the average energy savings from both RWH retrofit and new construction interventions is approximately 500,000 kWh.

Marketing and Partnerships:

Marketing for the refrigerated warehouses will be delivered primarily through third party contractors delivering a comprehensive set of services, although PG&E assigned Account Services representatives will remain an important link to the customers. Additionally, RWH savings and marketing will likely continue through trade ally projects sponsors under the calculated approach. The element will seek to educate RWH operators about offerings through direct contact, and partnerships with organizations including the following:

- RETA
- International Association of Refrigerated Warehouses
- Food Processing partners as listed above
- CEC R&E efforts in food processing

Education and Training:

- Integrated EE/DG/DR trainings will be delivered at industry conferences and in regions heavy with refrigerated warehouses

- During audits and evaluations, facility operators will receive O&M training for optimal operation of RWH systems.
- DOE Best Practices classes on motors, pumps, VFDs will be marketed to RWH customers, as appropriate
- PG&E will also complete the development of the Equest refrigeration module, which will be made available to the public at no charge. With education and training provided to customers, consultants and trade allies, this DOE2 based software will facilitate integrated, whole system refrigeration modeling in the marketplace.
- Customers often lack knowledge or resources to identify and implement energy efficiency opportunities, successful design strategies or new technologies or to assess potential energy and cost savings in new construction or major renovation projects. Offering project specific energy design assistance has been shown to be an effective method for delivering energy efficiency information to customers and helps to leverage additional savings through the interactive effects identified in integrated design. Additionally, the Program will use the well established EDR to develop new design briefs, case studies and design tools for designers and owners of medical facilities.

Audits and Benchmarking:

- PG&E will provide on site and integrated audits to RWH customers
- PG&E will coordinate with CEC efforts underway to seek appropriate benchmarking methodologies for refrigerated warehouses, recognizing that there is great diversity in the marketplace that may make this challenging.

Commissioning/Retro-commissioning/Real-time Performance Monitoring

- Refrigerated warehouses often operate under sub-optimal conditions. PG&E will seek to deliver real time monitoring and performance tracking opportunities for this market segment to ensure that energy savings are maintained.

Self Generation Opportunities

- Self generation opportunities are somewhat limited for refrigerated warehouses unless they are closely integrated with other food processing facilities that can effectively employ the waste heat from refrigeration activities.

Demand Response and Reduction Opportunities

- Evaluate floating refrigeration loads through peak periods
- If storage exceeds maximum temperatures, aggregate with other cold storage facilities and divide the curtailment period
- Evaluate use of thermal energy storage

In sum, the implementation strategies in this Agriculture and Food Processing Program vary greatly by sub-market. Dedicated PG&E resources and program managers will coordinate each segment to optimally deliver the goals and objectives of the Program.

11. Customer Description

PG&E's 89,000 agricultural and food processing customers consume approximately 6,300 GWh annually with a sum maximum peak demand of almost 1,680 MW. Customers in the segment are highly diversified and include small and large farms (dairies, greenhouses, crops, fruits, vegetables, and nuts) and food processors (including fruit and vegetable canners, fruit and vegetable dehydrators, fruit and vegetable freezers, prepared food manufacturers, wineries, and associated refrigerated warehouses). This market sector has very large untapped potential for energy savings as well as good potential for demand response and distributed generation.

12. Customer Interface

PG&E dedicated program staff, in conjunction with industry consultants and third parties, will present the Market Integrated Agriculture and Food Processing program to the larger agricultural and food processing industry customer. For smaller customers, e.g., particularly small agricultural pumping load customers, third party service providers (e.g., pump test firms) and PG&E staff in charge of mass market and statewide rebate program efforts, will be the primary points of contact. Customers will also learn of the program through PG&E direct marketing efforts, PG&E and co-sponsored education and training events, local agricultural organizations, and through trade publications. The market integrated DSM portfolio will provide customers easy access to energy efficiency options as well as appropriate option for demand response and distributed generation where appropriate.

13. Energy Measures and Program Activities

13.1 Measures Information

Many of the key measures for this program are discussed above. The cost effectiveness calculator contains end-use summary measures for the calculated incentive component of this program. Traditional Deemed savings elements are provided in the cost effectiveness calculator for the Mass Market Program. Incentive levels for the targeted market programs are being developed to reflect current market conditions.

PG&E is building on the statewide consensus of previous years to establish the rebate levels for the Mass Market program that will reflect current market conditions.

13.2. Energy Savings and Demand Reduction Level Data

As noted in section 13.1 above, measure-specific energy savings and demand reduction level data are contained in the cost effectiveness calculators provided as part of the June 1, 2005 submittal. The end-use specific values provided in the Agricultural and Food Processing Program calculator are based upon historic values from the Statewide Standard Performance Contract Program and Statewide Savings By Design Program. The achieved

energy savings and demand reduction levels will be calculated for each project employing the calculated savings approach.

13.3. Non-energy Activities

Non energy activities associated with and in support of the Agricultural and Food Processing Program are discussed above within the sections (particularly Section 10) relevant for each identified sub-market.

13.4. Subcontractor Activities

PG&E's portfolio of programs will integrate new and existing third parties as well as partnerships into each program. The need for additional subcontractors will be determined at that time. Possible areas for third party bidding consideration include the following:

- Agricultural pump testing activities
- Agricultural Sector Coordination and Oversight
- Dairies – targeted technology retrofits
- Food Processing – Emerging Technologies
- Refrigerated Warehouses – Turnkey Program Delivery
- Refrigerated Warehouses – Targeted technology retrofits

13.5. Quality Assurance and Evaluation Activities

PG&E will continue the level of quality assurance of the present programs including pre-inspections for larger or specialized projects and post-inspections on all large projects and a percentage of smaller projects similar to 2004-2005.

Additionally, PG&E desires that M&V track industry-specific metrics that indicate an increase of awareness of, participation in, and commitment to energy management program offerings. With this data, PG&E could strive to deliver the most cost-effective suite of services to the market segments to achieve the results desired, while recognizing that that new program elements, market interventions, and marketing efforts will incur higher start up costs than may be reflected as the Program matures.

- **Market Assessment and Customer Behavior Analysis:** These tasks will assist in assessing customer awareness, behaviors and practices given their participation in the Ag and Food Processing program. The data used will be drawn from the process evaluation survey of customers and from the verification data collection. The market saturation/market share/potential data from statewide studies currently underway will be another primary source of information for market assessment and baseline analysis

For each market served, M&V will establish adequate industry baselines and benchmarks such that PG&E can track program successes and adjust programs as required. Various

market indicators may be measured and tracked that have long-term implications to sustained program success, such as:

- Level of customer awareness of PG&E's portfolio of integrated energy management programs, by customer size and segment
- Level of customer satisfaction with PG&E's portfolio of integrated energy management programs, by customer size and segment
- Level of customer participation in each program element offered, by customer size and segment, including audits and testing, incentive programs, and education and training elements.
- Level of customer commitment to continuous improvements in energy management, as reflected by indicators such as integration of energy management in standard business practice, or percent of customers with dedicated "energy champions".
- Energy benchmarks by industry-segment (energy per square foot, energy per unit of product output). Benchmarks motivate customers by providing concrete indicators of performance and competitiveness on an individual, industry, national and international level. Benchmarks can also serve as success indicators for Programs in the portfolio on various levels.
- Industry-specific baselines of practices that may not be tied to California codes, such as industrial or agricultural design and engineering practices in new construction that effect energy efficiency and other energy management strategies. Where lacking energy codes, such baselines can support consistent and equitable Program calculations and incentives for improvements over industry "standard practice". They can also inform industry benchmarking efforts.

13.5.1. Expected Number/Percent of Inspections: (planned percent of projects)

The Mass Market Program will adopt a rigorous inspection plan that will ensure that deemed energy efficiency measures are installed and operational. Projects that are participating in calculated energy efficiency measures will be verified during an on-site visit as soon as a facility is substantially complete.

13.6. Marketing Activities

This program will be one component of an integrated marketing and outreach strategy. A variety of channels (e.g., technical and program information, case studies, fact sheets, seminars, brochures, advertisements, point-of purchase materials, trade shows, direct mail, and articles in industry publications) will be used as appropriate. Particular emphasis will be placed on Web-based information and assistance.

For specific sub-market marketing activities, refer to targeted sub-markets in Section 10.

14. Conclusion

This Market Integrated DSM program compliments the rest of PG&E's portfolio, contributes to the overall balance of the entire portfolio and is designed to achieve the Commission's energy savings targets.

15. Appendices

Documents shared with PG&E's Public Advisory Group and at the Public Workshops on the development of PG&E's 2006-2008 portfolio can be found on PG&E's Web site at [http://www.pge.com/rebates/program\\_evaluation/advisory](http://www.pge.com/rebates/program_evaluation/advisory)