

**PGE2004 FABRICATION, PROCESS AND HEAVY INDUSTRIAL  
MANUFACTURING**

2006 - 2008

1. Projected Program Budget	\$121,840,378
See Tables in Attachment III for components	
2. Projected Net Program Impacts	
MWh	475,376
MW (Summer Peak)	69.225
Therms	18,198,035
3. Program Cost Effectiveness	
TRC	2.34
PAC	3.85

Forecasted impacts for gas savings are incorporated in the Mass Markets; Agricultural and Food Processing; and Fabrication, Process, and Heavy Industrial Manufacturing programs.

4. Program Descriptors

Market Sector: Nonresidential / Industrial / Process /Fabrication  
 Program Status: New Program

The Fabrication, Process and Heavy Industrial Manufacturing program coordinates a diverse portfolio of products and services designed to enhance adoption of market integrated demand side management (MI DSM) practices among industrial and process-oriented customers in PG&E’s service area. The program serves the fabrication and process industries, water pumping and treatment, and wastewater treatment plant sub-sectors, which together comprise 15 percent of peak load. The primary objective of the 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 Fabrication, Process and Heavy Industrial Manufacturing program seeks to involve customers, industrial 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 efficiency.

The program integrates the following third party offerings:

- a) Wastewater Plant Efficiency Improvement Initiative Program – KEMA Inc.  
 An average-size wastewater treatment plant (WWTP) is expected to consume between 6,000,000 kWh and 10,000,000 kWh annually. WWTPs are complex,

highly developed networks of process vessels, pumps, piping, equipment and controls. Historically, WWTP operation has focused on meeting stringent discharge requirements with little operational focus on energy-use optimization.

This Initiative is a comprehensive approach to reducing energy use in WWTPs. The focus of the Initiative will be to optimize the use of electrical energy by providing technical support services and incentives to WWTPs that promote the installation of energy-efficient equipment and better process control. Services may include:

- Review of proposed expansion and redesign projects
- Identify potential energy saving measures
- Assistance with project design and energy savings estimation
- Support performance testing of potential process changes
- Incentives for energy efficiency improvements
- Support approval process
- Training of plant staff on new operation procedures associated with installed measures.

KEMA SERVICES will team with process design and operation experts well known and respected in the wastewater industry. The KEMA SERVICES team will market its program to the plant personnel and management most likely to influence the decision to proceed with project implementation.

b) Program for Energy Efficiency in Water and Wastewater Treatment Facilities in PG&E Service Territory – Base Energy, Inc. (BASE)

This proposal offers an integrated system improvement program that includes energy audit, system design and process optimization as well as introduction of technology improvement to enhance energy efficiency, reduce demand and promote co-generation using bio-gas.

The program is designed to have the following components:

- Marketing, by informing water and wastewater authorities of the potential for energy and cost savings through implementation of cost-effective energy efficiency measures as well as the services of the proposed program for realization of the savings.
- Performing detailed comprehensive audits of about 40 water and wastewater treatment facilities per year, preferably 20 of each.
- Signing agreements with those plants that are interested in implementation of all or some of the measures (estimated to be about 40 percent of each category).

- Full design assistance for implementation of the measures, with 75 percent of the cost of design to be paid by the program and 25 percent to be paid by the respective plants.
- Assisting the plant in bidding the project(s) and implementing the measures in selecting the contractors and vendors.
- Providing financial incentives based on the annual kWh and therms of energy savings at \$0.15/kWh and \$1/therm annual savings up to 40 percent of the cost of the project.
- Helping the plants apply for utility rebate.
- Verify the installation to close the project cycle.

The program will also include a component for new construction, which will also cover the expansion of the current plants. In the case of new construction, the following process will be followed:

- Review of the design documents for energy efficiency currently in practice for Savings By Design (SBD) projects and evaluation of the potential energy savings by implementation of the state-of-the-art technology.
- Provide financial incentives based on the annual kWh and therms of energy savings at \$0.15/kWh and \$1/therm based on annual savings up to 40 percent of the cost of the project upon implementation of the recommended technology.
- Assist the customer apply for utility Savings By Design incentives.

c) Efficient Boiler System (EBS) Program – SBW Consulting, Inc.

The Efficient Boiler System (EBS) Program will provide a measurement-based system audit, technical support during implementation, commissioning, savings verification and financial incentives to 20 large, non-residential customers that are served by the Pacific Gas and Electric Company (PG&E). Customers located anywhere in PG&E's service area that operate large boiler systems to meet their steam or hot water needs will be eligible for the program. EBS will offer an incentive of \$0.55 per therm saved up to 60 percent of project costs. Following implementation, EBS will also provide each participating customer's operations staff with intensive, on-site training on best practices for energy efficient operations and maintenance of their boiler systems. By providing these services and incentives, EBS will achieve gross savings of 2.1 million therms (net savings of 1.7 million).

EBS will use a measurement-based audit (flue gas analysis, infrared temperature measurement, power profiles, non-intrusive flow measurements) to determine the conditions and performance of the boiler system and to identify possible efficiency improvements. This detailed audit is performed to provide reliable cost

and savings estimates for possible energy efficiency improvements and to determine which should be presented to the customer for implementation. EBS will achieve long-term gas savings from improved operations and maintenance, controls, and equipment. Improvements may include economizers, digital controls, reduced blowdown, makeup water pretreatment, insulation, steam traps repair and boiler tune-up.

There are two equally important strategies for reducing the energy and demand requirements of boiler systems. The first is to motivate plants to adopt better operations and maintenance (O&M) practices. The second strategy is to make capital improvements to these systems that are consistent with the improved O&M practices. EBS will pursue a combination of smart maintenance and operations with appropriate capital improvements to obtain the largest gains in energy efficiency for the program participants.

EBS has a strong and growing team of engineers that have extensive experience in boiler systems, energy audits for large industrial and commercial facilities, and delivering of best practice training for boiler system operations and maintenance. Through EBS the program will offer the services of this team to provide free hot water and steam system audits, to assist customers with project implementation, to conduct rigorous measurement-based verification of savings from each project, and to help customers improve their long-term boiler system operations and maintenance program. Throughout the lifecycle of each project, EBS engineers will work closely with the customer's operations and maintenance staff to help them understand their boiler systems and the critical maintenance and operating practices that are needed to ensure the system is operated efficiently. Following implementation of its recommendations EBS will provide Best Practice operating and maintenance guidelines tailored to each customer's system.

d) Compressed Air Management Program (CAMP) – SBW Consulting, Inc.

The Compressed Air Management Program (CAMP) is a modified program that will continue to provide a measurement-based system audit, technical support during implementation, commissioning, savings verification and financial incentives to 15 large, non-residential customers, industrial customers that are served by the Pacific Gas and Electric Company (PG&E). To be eligible, customers must have a compressed air system with a capacity of at least 200 hp. An incentive of \$0.06 per kWh saved up to 60 percent of project costs will be paid to each participant that implements CAMP recommendations. This three-year program will achieve long-term kWh savings from improved operations, controls, and equipment for large compressed air systems.

The program takes a comprehensive approach to energy efficiency for each compressed air system. We consider both O&M and capital improvements in the compressor room, distribution system and end uses. CAMP's objective is to optimize system energy performance while maintaining or improving compressed

air quality and the reliability of the compressed air system. Examples of the improvements that can be made under CAMP include: reduction in distribution losses due to pipe resize/routing and removal of abandoned piping; reduced end use loads achieved by replacement of air drives and proper application of engineered nozzles, improved controls, distribution system upgrades to reduce leakage, more efficient air treatment equipment, heat recover, and compressor resizing and replacement

Throughout the lifecycle of each project, CAMP engineers will work closely with the customer's operations and maintenance staff to help them understand their compressed air systems and the critical maintenance and operating practices that are needed to ensure the system is operated efficiently. Following implementation of its recommendations CAMP will provide Best Practice operating and maintenance guidelines tailored to each customer's system.

e) Heavy Industry Energy Efficiency Program - Aspen Systems Corp.

Lockheed Martin Aspen Systems Corporation,\* serving as the Program Manager, will deploy Project Champions to identify and facilitate implementation of major process-oriented and other energy-efficiency upgrades for PG&E's very large (>500 kW) heavy industry and water/waste-water customers. The Project Champions are industry experts who will lead our team's efforts and provide design assistance, engineering support, and financing guidance. These activities will enable customers to reduce power demand, save energy and water, improve productivity, reduce emissions and waste materials, and become more competitive. The Program Manager will complete 60 projects over 33 months, reducing demand by a total of at least 5,000 kW and saving annually at least 16,800 MWh and 1.76 million therms of natural gas.

The benefits objectives are:

- ◆ Rapid startup based on a proven program design that has achieved significant energy savings, demand reductions, and process/productivity efficiencies for our west coast heavy industry clients.
- ◆ Bottom-line enhancement—along with increased competitiveness and decreased environmental impact—for PG&E's large customers.
- ◆ Increased customer acceptance, satisfaction, and cost savings through integration of energy options from PG&E and its trade allies and national, state, and private sector energy conservation programs.
- ◆ Cross-selling of PG&E and California Public Utilities Commission (Commission)/California Energy Commission (CEC) programs through press releases, case studies, best practices articles, and Web links.

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\* Aspen Systems Corporation was acquired by Lockheed Martin Corporation on January 26, 2006, and is now a wholly owned subsidiary of that corporate organization.

- ◆ Training of customers in new and emerging energy-saving technologies as a key element of our marketing strategy.

f) Refinery Energy Efficiency Program (REEP) – Nexant, Inc

The refinery industry is currently under-served by the current suite of energy efficiency (EE) programs. None of the pre-2006 DSM programs effectively address the market barriers, particularly the industry's long lead-time to develop and implement energy saving projects in refineries. The Refinery Energy Efficiency Program (REEP) is designed to address the key market barriers by leveraging Nexant's refining expertise from its Petroleum and Chemical division and DSM program implementation experience from its Energy Management division. The Program also fully uses the lengthened duration of the PGC funding cycle to specifically address the long lead-time for refinery projects. Among the identified strategies to address prevalent market barriers are the following:

- Demonstrate availability of proven technologies to potential participants by showcasing case studies and successful projects;
- Identify cost-effective projects, and provide and apply industry-specific experience for selection and design of the EE projects;
- Use of incentives to offset capital investments;
- Provide assistance in project management/coordination (hand-holding).

The Program will also produce at least three case studies upon successful installation of the projects and verification of savings. Case studies help to create and/or increase the awareness of energy efficiency in the refining industry through publication in trade magazines, possible presentation in PG&E's energy centers, distribution at trade shows, and discussion in direct customer contacts.

The REEP will work closely with the refining customers and refining industry equipment and service suppliers to install energy efficiency measures. The program provides direct incentives and project management assistance for the projects.

g) Energy Efficiency Services for Oil Production – Global Energy Partners, LLC  
Global's Energy Efficiency Services for Oil Production program is targeted toward the hard-to-reach independent oil producers in California that are struggling to control costs and remain competitive. Independent oil producers are those operations that are not owned by a major oil refiner like Chevron, ExxonMobil, ConocoPhillips, or Shell. The main objective of the program is to assist these producers to become more energy-efficient and productive.

To capture these energy savings, Global will implement a program design that has demonstrated solid, cost-effective results using a "hands-on" approach to program

implementation. In addition, the proposed program builds upon Global's extensive working knowledge of the oil production market segment and Global's hard-earned recognition within the oil production industry to provide unbiased technical assistance and support. Furthermore, the proposed program provides a foundation for Global to provide a full range of energy support activities to the oil production market segment.

**h. California Wastewater Process Optimization (CalPOP)–Quantum/Quest**

This program has been extended into 2006 and was a prior year program. Quest will market its program to the plant personnel and management most likely to influence the decision to proceed with project implementation.

This program offers an integrated system improvement program that includes energy audit, system design and process optimization as well as introduction of technology improvement to enhance energy efficiency, reduce demand and promote co-generation using bio-gas, provide an incentive for implementation of recommended measures and provide training to implement best practices.

The target market program also integrates the following local government initiatives:

- a) Municipal wastewater treatment plant energy efficiency upgrade in Sonoma Energy Watch Partnership

This program will also work closely with the Silicon Valley Leadership Group.

**5. Program Statement**

The program targets customers from the fabrication and heavy industrial segments of manufacturing as well as process industries including printing plants, plastic injection molding facilities, component fabrication, lumber and paper mills, cement and quarries, metals processing, petroleum refineries, chemical industries, assembly plants, and water and wastewater treatment plants. Together, these customers consume approximately 32,646 GWh annually with a peak demand of 7284 MW.

There are significant opportunities for energy efficiency improvements in the Fabrication, Process and Heavy Industrial Manufacturing segments, primarily in industrial process systems. Detailed consumption and savings estimates by market sub-segment can be found in Section 11.

Target Sub-Markets: While customers in this program share an emphasis on process technologies, program implementation strategies will vary based on the end-user and the environment in which they are operating facilities. For purposes of program implementation and definition, the Fabrication, Process and Heavy Industrial Manufacturing program will be broken into three target sub-markets:

- Industrial manufacturing (includes industrial, fabrication and process)
- Oil and gas extraction and refining
- Water supply, water treatment and wastewater treatment

Industrial Manufacturing Market Characterization: Industrial facility energy managers are typically interested in controlling costs associated with water, air, gas, electric, and steam (WAGES) while maximizing production output from their processes. As management of WAGES requires ongoing facility and plant manager education as well as training, benchmarking and system monitoring, there is high market demand and substantial opportunity for PG&E to promote energy efficiency as an integral component of a cost-effective, competitive, high-performance facility. Putting energy efficiency in the context of non-energy benefits such as increased production, higher quality products, and better process control is important in understanding decision making processes within this market segment and promoting MI DSM projects. The strong water-energy connection in industrial processing provides an additional significant untapped opportunity to help industries reduce multiple utilities through coordinated plant improvements.

Major crosscutting electric-consuming equipment in industrial facilities includes pumps, motor systems and compressed air systems. Other large facility consumers include industrial boilers and process heating. Gas consumption is especially high in this target segment, specifically in industries such as petroleum, oil and gas and stone/clay/glass, and will provide good opportunities for achieving therm savings.

PG&E's industrial characterization study showed that retrofits in process systems showed significant energy savings potential. System efficiency measures can save up to 9 percent of motor energy use, with the potential for pump system savings and compressed air system savings of 15 percent or more of each systems energy use. Applicable motor efficiency measures can save another 5 percent of total motor energy usage.

**Industrial Motor Savings Potential in California**

Application / Measure	Energy Use (GWh)	Savings Potential (GWh)	Savings %
Motor System Measures			
Fan System	2,338	118	5%
Pump System	4,237	803	19%
Compressed Air Systems	2,703	461	17%
Other Process Systems	7,808	154	2%
<b>All Systems</b>	<b>17,086</b>	<b>1,535</b>	<b>9%</b>
Motor Efficiency Measures (Apply to All Systems)			
Efficiency Upgrades	17,086	581	3%
Motor Downsizing	17,086	205	1%
Replace vs. Rewind	17,086	142	1%
<b>All Motor Efficiency Measures</b>	<b>17,086</b>	<b>928</b>	<b>5%</b>
<b>Motor Systems Totals</b>	<b>17,086</b>	<b>2,463</b>	<b>14%</b>

Other savings are achievable through new construction and additional opportunities by encouraging customers to adopt behaviors such as specifying premium efficiency motors and building appropriately sized systems with controls.

Oil and Gas Extraction and Refining Market Characterization:

The oil and gas industry sub-segment consists of oil and gas extraction firms, crude petroleum and natural gas refineries, oil and gas drilling operations, oil and gas field service firms, and oil and gas exploration companies. Petroleum refineries are among the largest users of natural gas and electricity in California. Combined with their oil and gas extraction counterparts, this market sub-segment constitutes the largest user of natural gas and electricity in the state and is a major driving factor in the California economy. Together, these customers consume approximately 3950 GWh and 2090 therms annually.

In an environment dominated by rising demand for their product, the market actors in this sector are driven by increasing regulation and difficulty in permitting. The unique nature of the processes involved in this market provides both energy efficiency challenges and opportunities. Innovation in energy sources (e.g., clean-up and use of off-gasses as well as coke and asphalt gasification) is needed to maximize the use of process by-products and minimize use of natural gas. In a 24 hour per day, seven day per week industry that is highly driven by production demand, there is little willingness to risk production capacity on any technology that has not already established high reliability in the market.

Throughput, safety, and environmental concerns are the top three priorities at any refinery. Energy efficiency is a distant fourth or fifth. When opportunities for equipment upgrades do occur, use of available capital tends to be dominated by legislated environmental improvements and maintenance upgrades are carefully orchestrated to minimize downtime. Energy efficiency improvements typically drop

off of the list of scheduled upgrades. Operational adjustments that would reduce energy use often fall by the wayside due to safety considerations or a management focus on minimizing short-term maintenance expenditures. Operator and management compensation is often tied to minimizing maintenance expenditures that would dramatically improve energy efficiency.

A sub-segment program which can gain traction in this market must be able to address the barriers, drivers, and challenges that are unique to this market in order to reap the high potential available from it.

Water Supply, Water Treatment and Wastewater Treatment Market Characterization: Water supply, water treatment and wastewater treatment present a different, but equally significant, untapped opportunity for energy and demand savings. Most cities and counties in the United States provide these services to their communities. There are approximately 2,700 water supply, water treatment and wastewater treatment facilities in PG&E's service area. These facilities are typically the single largest line item on municipal budgets, with energy accounting for up to 35 percent of municipal energy usage. Studies have estimated the energy savings potential at 15-30 percent.

Since facilities operate 24 hours a day, the potential to reduce peak demand is also a significant factor. A host of non-energy benefits exist as well, including a reduction in the accumulation of solid waste, a decrease in the use of chemicals, longer equipment life and better control. Cities and counties are actively seeking efficiency improvements to reduce operating expenses, while at the same time, the water/wastewater industry is constantly faced with increasing costs that stem from aging infrastructure, new health regulations and population growth. With current and future population growth in California, new construction of water treatment and wastewater treatment plants is ongoing, and existing plants are constantly expanding capacity. Other factors affecting facility projects and constraining budgets include increasing requirements to treat wet weather flows, increasingly stringent local and federal discharge requirements, federal requirements around pollutants such as arsenic, increasing adoption of ultraviolet instead of chlorine to disinfect, and a desire to reduce water through wastewater re-use.

PG&E can continue to take advantage of these ongoing projects to work with water and wastewater treatment facilities to optimize efficiency. To pursue water projects, PG&E will coordinate with local governments and municipalities. Once a partnership is developed and trust established, PG&E program history has shown that cities continue to work with PG&E to deliver energy savings. Additional partnerships to develop and promote the program will include the California Energy Commission (CEC), the Consortium for Energy Efficiency's (CEE's) Water Committee, the Department of Water and Power, and industry-based organizations.

Crosscutting Program Elements: In addition to customer-specific efforts and activities, an integral strategy for the Process and Heavy Industrial Manufacturing program will

involve education, training and demonstrations on crosscutting energy management opportunities. These interventions will focus on both energy efficiency technologies (pumps, motors, VFDs, industrial lighting, various emerging technologies, the water/energy efficiency connection), and appropriate distributed generation opportunities. Crosscutting elements such as a pumping efficiency seminar could be designed to be relevant to both a water treatment plant and an industrial manufacturing plant with a heavy pumping load.

Program Implementation Strategies: Various implementation and delivery strategies will be utilized in this Program, depending on the targeted sub-market. Specific program delivery details will be clarified after the third party bidding process is completed

In sum, the Fabrication, Process and Heavy Industrial Manufacturing program will coordinate a market-integrated, targeted approach to both industrial manufacturing and water supply and water and wastewater treatment customers. By combining previously stand-alone program offerings into vertical market segments oriented to the unique needs of the target customers within them, gaps and overlaps that existed between program elements can be resolved, and efficiencies can be gained, resulting in a much more effective approach. Wherever possible, PG&E will strive to deliver Fabrication, Process and Heavy Industrial Manufacturing program elements that are consistent on a statewide basis with other utilities to maximize market potential and minimize customer confusion. PG&E will also work to adopt “Best Practices” from similar national industrial IDSM programs. PG&E’s portfolio of products and services for this segment will include information and training components, facility audits, customized design assistance and calculated incentives for new construction and retrofits, and integrated demand response and distributed generation elements.

## 6. Program Rationale

California has significant industrial, water and wastewater treatment energy loads: Together, these customers consume approximately 32,746 GWh annually with a peak demand of 7284 MW. While the customers included in this market segment vary in product and process, they are highly energy-intensive industries for which energy bills are significant in comparison to profit margins.

### Barriers:

- Lack of resources for a dedicated energy manager who can be the “Energy Champion” to drive projects and continuous improvements
- Time commitment required to identify energy-efficiency opportunities and projects;
- Time and costs associated with selecting implementation contractors for projects;
- Lack of information on facility or system performance, available technologies, and available programs for energy efficiency

- Lack of trustworthy data about project savings, lifecycle costs, and return on investment;
- Lack of operator training regarding energy efficiency in practice and operation;
- Capital costs associated with increasing energy efficiency;
- Lack of facility benchmarking data to compare performance with peers; and
- Competitive markets can drive short term survival attitudes that delay energy efficiency projects.

Customers are Increasingly Receptive: Mature or declining markets facing tight regulatory requirements and high labor costs are prime candidates to reduce their energy use through targeted and coordinated program outreach. Fabrication, Process and Heavy Industrial Manufacturing 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 and environmental stewardship gain traction in various markets 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 Fabrication, Process and Heavy Industrial Manufacturing Program, these would include product quality improvements, better process control, associated water reduction, pollution credits, and marketing energy efficiency as a key component of corporate sustainability practices, among others.

Partnerships: Partnerships are an important component of delivering the Fabrication, Process and Heavy Industrial Manufacturing Program. Industry-specific groups for water or wastewater treatment, local chambers of commerce or economic development groups for industrial manufacturing, and specialized trade allies can provide direct access to specific end-use customers through their existing marketing channels, facilitating highly targeted marketing strategies. PG&E will be teaming with various industry-based organizations as well as local, California, multi-state, national, and federal programs to penetrate target audiences and develop win-win scenarios for customers.

There are numerous efforts ongoing to improve industrial and water/wastewater energy efficiency in the U.S. This market-integrated, targeted approach allows PG&E to better align its program offerings with local, state, national and industry specific efforts that are organized similarly. PG&E will increasingly collaborate with partners to reinforce messages and strategies for industrial customers, to gain efficiencies, and to provide customer's turnkey energy management support through connecting them with non-PG&E programs, low interest financing and other opportunities. These collaborations will vary widely, from helping customers implement and demonstrate promising emerging technologies being researched at the CEC, to providing joint project funding

to improve project cost effectiveness, to supporting the Department of Energy (DOE) with co-sponsoring compressed air, motors, steam, process heating, pumping, and fan classes. The DOE's industrial assessment centers provide a ready database of industrial projects that could be coordinated with PG&E's program offerings. Other industry-specific efforts ongoing in the state and nationally, such as the CEE new Water and Wastewater Treatment Initiative, provide PG&E valuable tools and resources for industry research and the continuous refinement of program offerings.

A coordinated program effort including long-range energy management planning, ongoing facility benchmarking and monitoring, project incentives, project financing, and operator training will make significant inroads in achieving higher-end savings through more complex projects. The use of trusted industry experts, familiar with their facilities, business cycles, operations, investment-tolerance, and efficiency opportunities, will be a critical factor in this strategy.

## 7. Program Outcomes

The major objective 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 objectives for this Program:

- Single point of contact: Provide a single point of coordination and contact for Fabrication, Process and Heavy Industrial Manufacturing customers. Work with these customers to help them access all energy efficiency programs available through PG&E.
- Reduce confusion and barriers to participation: Reduce customer confusion through appropriate alignment of PG&E's marketing materials with other applicable programs such as Education, Training, Codes and Standards, Emerging Technologies, and Mass Market.
- Optimize new construction: Ensure that the full complement of energy efficiency measures that could be employed in the Fabrication, Process and Heavy Industrial Manufacturing markets in new construction or expansions 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. PG&E will stress industrial Best Practices for process loads not regulated by California code.
- Integrate energy efficiency into standard practice: Motivate industrial customers and design industry professionals and engineers to integrate efficient energy use and environmental considerations into their standard process of design to achieve cost-effective levels of energy and resource efficiency. Provide the market adequate tools and resources for this to be a simple, natural consideration.
- Optimize existing facilities to stay competitive: Help California's Fabrication, Process and Heavy Industrial Manufacturing facilities become more competitive by

saving money, increasing production, improving product quality, or reducing non-energy utilities while also delivering energy savings to the portfolio.

- Optimize water and wastewater treatment plants: Help California's cash-strapped cities and counties save money and resources by optimizing one of their single largest budget line-items.
- 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. Raise awareness among senior-level decision makers about the benefits of energy efficiency in their facilities.
- 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 and other collaborative relationships to support a fully integrated portfolio of relevant programs, tools and information for Fabrication, Process and Heavy Industrial Manufacturing customers.
- Facilitate technology transfer: Use existing technologies in new applications or among industry groups that have very low technology adoption rates. PG&E will coordinate with industry groups, the CEC, the Department of Energy and other aligned entities to plan and implement demonstration projects that promote the use of relatively new technologies within market segments that have not yet adopted the technology.
- Promote energy efficiency trade allies: Provide continuous education, training, tools and resources to the large community of vendors and trade allies in California that can act as sponsors for energy efficiency projects, and who are critical to delivering energy savings.
- Tracking success: Additionally, program outcomes should include sufficient evaluation, measurement and verification (EM&V) to track an industry's awareness of, participation in, and commitment to energy management program offerings. For each market served, 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 market integrated demand side management (DSM) programs, by customer size and segment
  - Level of customer satisfaction with PG&E's portfolio of market integrated DSM 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 efficiency, as reflected by indicators such as integration of energy efficiency 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 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.
- Maximize Demand Response and Distributed Generation opportunities and structure into overall program design.

## 8. Program Strategy

The overall program strategy is to increase customer participation in the full menu of existing and proposed energy efficiency programs by reducing market barriers and coordinating multi-channel program delivery using 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 with industry organizations are essential given the insular nature of the market sub-segments.

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 will maintain direct contact with all major customers in this segment and sub-segments to assure involvement in facility construction and renovations.

This program will first focus on 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., oil and gas pumping, refineries, and

wastewater treatment facilities) and by cross market energy systems (e.g., pumping, refrigeration, water, and process heating).

The Fabrication, Process and Heavy Industrial Manufacturing program will combine program interventions, such as retrofit and new construction elements that were previously delivered across various markets, into one integrated program to reach this market segment. The program will target the unique needs of the customers within this segment, resolving gaps and overlaps that previously existed between program elements and resulting in a much more effective approach. Administrative costs will be reduced by achieving economies of scale and by combining systems and staff functions.

Wherever possible, PG&E will strive to deliver Fabrication, Process and Heavy Industrial Manufacturing 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 and targeted to the market segment and sub-segments:

**A. Education and Training.** The program will coordinate Education and Training activities to best meet the needs of the market. Information, education, and training activities for this market segment are critical to justify customer investments in energy efficiency and energy management.

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

- 1) **Energy Audits:** On-site and other audit activities associated with the Nonresidential Audits program will be an element of the Fabrication, Process, and Heavy Industrial program
- 2) **Benchmarking** (by customers and by target industry): Benchmarking and self assessment tools will be adopted or developed wherever possible for target market segments, as an informational, motivational and strategic tool for customers and utilities
- 3) **Codes and Standards (or industrial Best Practices):** While the most significant Fabrication, Process, and Heavy Industrial loads are not covered by Codes and Standards, PG&E will work to support the adoption of industry-specific and crosscutting technology Best Practices
- 4) **Emerging Technologies and Technology Demonstrations:** Target ET and demonstrations for Fabrication, Process, and Heavy Industrial target customers will be delivered to the market.
- 5) **PG&E Clearinghouse:** PG&E's web and phone-based Information Clearinghouse will serve as a central referral point for Fabrication, Process, and

Heavy Industrial program information and services. It will also coordinate non-PG&E tools and resources relevant to the market (i.e., case studies, available financing or grants, etc.)

- B. Deemed Incentives.** The Fabrication, Process, and Heavy Industrial program will assemble and deliver segment and sub-segment targeted information on PG&E's deemed savings rebates. The deemed savings component is not expected to be a significant portion of the Fabrication, Process, and Heavy Industrial Program savings delivery, as most outreach to this segment will involve calculated rebates and incentives. Design assistance services will also be offered in conjunction with deemed savings rebate options, as appropriate.
- C. Calculated Incentives.** The calculated approach will offer incentives for more complex or customized retrofit and new construction projects, and will provide in-depth, technical design assistance for customers. Program offerings and incentive rates will be aligned with statewide programs such as Savings By Design as appropriate and to the extent possible.
- D. Demand Response.** The Fabrication, Process, and Heavy Industrial program will coordinate activities with demand response (DR) programs to integrate DR technologies and program offerings, to better serve the customer, and to minimize missed opportunities.
- E. Distributed Generation.** The Fabrication, Process, and Heavy Industrial program will coordinate activities with distributed generation (DG) programs to integrate DG technologies into program offerings, better serve customer, and minimize missed opportunities.

The Fabrication, Process, and Heavy Industrial program will use teams of experts and industry professionals, varying by market sub-segment, to deliver energy efficiency services to the customer. These teams will consist of market-dedicated internal resources, external consultants with market expertise, and third parties who may deliver program elements, technology-specific services, or entire sub-segment interventions. Vendors may also delivery energy savings as project sponsors through either the Calculated or Deemed savings approaches. PG&E will provide the primary point of contact to coordinate the various program elements described above. PG&E Program representatives will meet regularly with assigned Fabrication, Process, and Heavy Industrial customers, as well as partners, third parties, and industry groups, to provide the continuous feedback loop required to track and adjust the Program as necessary.

The Fabrication, Process, and Heavy Industrial program will employ primarily calculated energy savings incentive mechanisms. While there is growth in some sub-markets within this segment, the majority of Fabrication, Process, and Heavy Industrial sub-markets are either stable or consolidating. Therefore, it is estimated that the

majority of energy savings opportunities in this segment will be secured from retrofit projects.

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 program have been accounted for in the Mass Market and Education and Training programs components.

The program will include statewide elements as well as elements specifically targeted to these highly specialized customers' needs. Program efforts will support project development through on-site facility audits, facility benchmarking, along with customized design assistance and engineering support for projects requiring the calculated approach. Deemed savings measures will constitute a smaller percentage of the savings in these markets, primarily lighting, and will be provided through the Mass Markets program.

Local government partnerships ("Partnerships") may be funded, in part, through this market segment. Such partnerships will be undertaken where the greatest opportunities exist for leveraging savings in a given jurisdiction. This approach may be optimal in many cases because local governments are often in the best position to understand the needs of local industries, business, and institutions. The approach will blend the benefits of common programs and strategies from statewide program elements with the local knowledge of markets and barriers

In particular, PG&E will coordinate closely with cities and counties governments on the water and wastewater treatment component of this Program.

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

Education, marketing and energy audits will be specifically tailored to the various customer groups and at the same time useful for most customers in each group. Both retrofit and new construction efficiency improvements are often too complex to be predetermined with a simple calculation. Customers using the calculated savings approaches capture interactive effects of different end-uses to maximize savings. Thus, the majority of savings for this market segment will be realized in calculated approaches. At other times deemed savings measures will be used to capture quick energy savings.

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.

The Fabrication, Process and Heavy Industrial Manufacturing program will use a mix of dedicated PG&E resources, technical experts, third parties, and crosscutting information and outreach programs to do the following:

- Provide long-term, coordinated energy management, planning and project support to industrial customers to help them reduce energy expenditures and remain competitive in California and globally. Customers will have a dedicated resource provided by PG&E that will provide the energy, non-energy and strategic expertise that so many facilities lack;
- Support the development of plant and facility Energy Champions through education, training, and certification, if possible, who will act as critical internal drivers for continuous facility energy improvements. Help companies develop strategies to empower energy champions;
- Utilize industrial energy experts to provide design assistance and project engineering support to gain the confidence of customers with unique needs in order to drive project commitments
- Utilize industrial energy experts to provide industry-specific education on best practices, new and emerging technologies, and benchmarking opportunities;
- Grow PG&E's network of trade allies and energy service companies. Provide trade allies continuous program updates, on-line training opportunities, tools, resources, and best practices. Develop opportunities to connect vendors with interested customers. Reinstate a Trade Ally Newsletter that can be targeted to specific vendors with specific specialties or targeted to geographical areas;
- Through the PG&E Web- and phone-based Clearinghouse, provide industrial stakeholders with comprehensive information on market integrated DSM as it relates to their industry, including the publication of industry-specific best practices, case studies, and information on emerging technologies. In addition to PG&E program resources and services, the Clearinghouse will connect users to relevant non-PG&E related resources.
- Pilot an audit-to-projects on-line bid concept which will allow trade allies to bid on projects based on audit results from customers who choose to post them through the Clearinghouse web portal.

## 9. Program Objectives

Program non-energy goals include those objectives discussed in Section 7.

## 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.

### General Program Activities

PG&E and industry experts will meet with customers to identify and prioritize their specific energy needs including information/seminars on recent industry and technology developments, site specific energy audits, energy efficiency retrofit options, retro-commissioning, benchmarking or new facility design assistance. Together they will develop a comprehensive energy efficiency plan to reduce energy use, which will include the following:

Long-term energy planning for industrial customers and water and wastewater treatment plants. PG&E Representatives, in conjunction with industry specific experts and third parties, will work with owners, plant managers and engineers to develop short- and long-range plans for facility improvements using available program elements. Early knowledge of projects and plans is critical to allow PG&E to provide project support, resources and information early in the planning stages, when energy efficiency is most cost-effective and viable.

PG&E will continue to provide specialized integrated audits to inform customers about energy efficiency, demand response and distributed generation opportunities that might be appropriate to their specific facilities and to support the development of high-potential energy projects. Time of use and interval meter customer data will be used to target customers with 200 KW or higher for these integrated energy audits to address energy efficiency, demand response and self-generation opportunities.

Industry benchmarking is a powerful tool to help industries recognize their energy performance in comparison to similar facilities in a multi-facility company or with their industry peers. It can provide a useful platform for planning and implementing ongoing energy performance improvements and monitoring. PG&E will use the customer's own billing data as well as collaborate with various state and national entities to develop user-friendly benchmarking tools as a critical component of energy planning.

PG&E will continue to develop and provide industry-specific best practices and case studies to support the adoption of energy efficiency. Existing publications, available through the DOE or CEC, will also be made available through links on PG&E's website.

Ongoing energy efficiency training for owners, operators, plant managers and engineers is critical. PG&E will continue to offer classes currently offered through PG&E's Industrial Strength Seminars and will continue to collaborate with the DOE and CEC on technology-specific classes on industrial process systems, such as those offered through the Compressed Air Challenge, Steam Systems Matter, and Motors Decisions Matter. PG&E will also develop industry-specific classes that will integrate energy efficiency, DG, and DR and be offered regionally, such as those for water and wastewater treatment.

PG&E will provide project design assistance for new construction and expansion projects to help customers build facilities and systems that surpass Title 24 code and/or perform better than industry standard practice.

Design assistance and engineering support will be available for retrofit projects. Early intervention using an industry expert can help prevent value engineering that can hinder energy efficiency, and can help support and finance whole system, integrated, cost effective projects. Best practices and case studies will be available for marketing.

PG&E will continue to provide calculated energy saving incentives for retrofits and new construction to help customers overcome first-cost barriers to energy efficiency and to help lower project payback. Incentives also help project managers sell projects when presenting them to senior management or, in the case of water and wastewater treatment plants, local planning committees.

Commissioning and retro-commissioning services will be provided for on a market sub-segment specific basis with special emphasis on water and wastewater treatment plants.

PG&E will continue to work with customers, manufacturers, industry experts, the CEC and others to support the ongoing development, demonstration and distribution of new and emerging technologies to support energy efficiency for industrial manufacturers and water and wastewater treatment customers.

Third party efforts may be incorporated into this program to target specific, high potential industries and may include one or more of the above components.

#### Audit Services

Customers often lack knowledge about identifying energy efficiency opportunities and assessing potential energy and cost savings. The offering of energy audits assists in filling this void. Over the years, audit services has 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 Fabrication, Process and Heavy Industrial Manufacturing industry 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 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 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.

#### 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, per gallon pumped) 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 used and will be further developed for broad application.

#### Deemed Savings

Deemed savings rebates offer a simplified process for customers to apply for and receive a 'per-wadget' rebate to reduce capital investment costs of installing higher efficiency equipment or retrofitting outdated and inefficient lighting, HVAC, pumping equipment, or compressors. Although deemed savings measures are filed separately under the Mass Markets program, the Fabrication, Process and Heavy Industrial Manufacturing Program will coordinate marketing and customer access to these incentives for its customers. Deemed savings measures are not expected to be a significant portion of the Fabrication, Process and Heavy Industrial Manufacturing program savings, however they may be appropriate for certain non-process measures such as lighting retrofits. Deemed savings will also be available to some small new construction projects for which calculated savings are not appropriate.

#### Calculated Savings

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 pumps due to piping sizes and design practice).

The calculated approach will build upon the tools and resources of programs such as Savings By Design Program and, to the extent possible, PG&E 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 customers in charge of capital budgeting and facility development.

Calculated incentives will be determined using building and process energy modeling (based on 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), though many integrated process system calculations will require 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 may

vary, as 10% is not always achievable, e.g., motors). Retrofit projects will be paid based on all savings beyond the baseline. Where possible, existing 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.

**Program Design Details**

The Fabrication, Process and Heavy Industrial Manufacturing segment is comprised of a wide variety of facilities and industries with differing potential. While this makes the segment harder to characterize overall, use of industry information and studies makes it possible to identify several major sub-segments with homogenous characteristics as well as major end-uses common across niche industry sub-segments. Within PG&E's service territory, the Oil and Gas sub-segment, including both extraction and refining, offers a generally contiguous set of market actors with similar drivers. Likewise, Water and Waste-water Treatment provide a market that can be effectively addressed as a whole. Beyond these major sub-segment groupings, the Fabrication, Process and Heavy Industrial Manufacturing program focus is best organized around major end-uses including motors and pumping systems, boilers, process heat, space cooling, and lighting. These groupings form the basis of the interventions proposed for this market segment. Specialty or niche processes such as liquid membrane technology in the chemicals industry, ultrasonic drying for textiles, and metals casting processes will be addressed on a project by project basis.

**General Industrial Manufacturing:**

The General Industrial Manufacturing sub-segment includes a diverse group of market actors for whom energy constitutes lifeblood. The sector is dominated by a small number of large market actors. The largest of these account for only 6% of site operations in the sector but consume 74% of sector kWh, while the smallest comprise 80% of the sites but account for less than 11% of electric consumption.

An effective approach to this sector can be built around technologies common to all market actors in the sector with specific outreach tailored to the highest potential sites and sectors.

**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 program elements.

- The US Department of Energy, Office of Industrial Technologies
- EPA regional offices
- California Energy Commission related programs

- Local community based organizations, local government agencies, and Local Government Initiatives as appropriate
- Potential Third Parties.

Education and Training Seminars:

- Integrated EE/DG/DR trainings
- DOE Best Practices classes on motors, pumps, VFDs, compressed air will promoted
- Workshops will be coordinated for delivery at industrial conferences,

Fabrication, Process And Heavy Industrial Manufacturing Retrofits, New Construction Interventions and Incentives

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
  - Waste heat recovery
  - Water efficiency
  - Steam system efficiency
- Efficient boilers and chillers
- Lighting retrofits with demand reduction/response controls
- Waste water reductions
- Meters and controls for real-time equipment monitoring and evaluation
- Automation for precision temperature control

Targeted Demand Reduction/Response

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

Target Distributed Generation and Cogeneration Opportunities

- Waste heat recovery
- Cogeneration

**Oil and Gas Industry**

Activities in the oil and gas industry include exploration; drilling, development of wells; steam injection; pumping; materials separation; and storage.

PG&E will implement an Oil and Gas Industry sub-market component managed by in-house resources with the consideration that this specialty market will require additional design and ongoing delivery through a third party. A Third Party implementer will be sought who can deliver specific targeted services, or optimally, whole program elements. Program components for this sub-segment will include sector specific, integrated education and training seminars, process and operational audits, benchmarking, incentives for retrofits and new construction performance improvements over standard practices, and technology demonstrations.

Marketing Strategy and Partnering Strategy:

PG&E will use traditional (assigned PG&E Representatives) as well as newly developed marketing channels and outreach resources to target program marketing and interact with market actors in this highly insular sub-sector. More importantly, PG&E will link objectives and strategies with the following groups and resources in the design and implementation of program elements.

- The US Department of Energy, Office of Industrial Technologies
- Western States Petroleum Association
- The American Petroleum Institute
- The Gas Research Institute
- EPA regional offices
- California Energy Commission related programs
- Local community based organizations, local government agencies, and Local Government Initiatives as appropriate
- Potential Third Parties.

Retrofits, New Construction Interventions and Incentives

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.

- Catalytic Process Interventions
- Industrial process system optimization
  - Compressed air
  - Motors
  - Pumps
  - Waste heat recovery
  - Water efficiency
- Efficient boilers and chillers
- Lighting retrofits with demand reduction/response controls
- Meters and controls for real-time equipment monitoring and evaluation
- Automation for precision temperature control
- Life cycle Costing (versus first cost) application to capital investment strategies

- Maintenance practices that enable continuous energy efficiency improvements (e.g., stocking of high efficiency replacement motors and pumps, rigorous routine steam trap maintenance).

Targeted Demand Reduction/Response

- Staged controls on lighting, HVAC and other non-process building measures
- Other measures to be investigated and developed

Target Distributed Generation and Cogeneration Opportunities

- Maximizing waste heat recovery
- Additional Cogeneration (target market already has high cogeneration uptake)
- Plant waste gas clean-up and use

Education and Training Seminars:

- Integrated EE/DG/DR trainings
- DOE Best Practices classes on motors, pumps, VFDs, compressed air will be promoted
- Workshops will be coordinated for delivery at industrial conferences,

Demonstration Opportunities

- Measures to be investigated and developed in conjunction with 3<sup>rd</sup> Party Implementer

Water/Waste Water Treatment

Water and waste water outreach will include both water supply and sewage treatment sub-segments.

Energy Savings for Water and Wastewater Treatment: For water pumping and water treatment facilities, approximately 95 percent of energy goes to pumping, and 85 percent of which is for distribution pumping. For wastewater treatment facilities, however, blowers for aeration of activated sludge account for 50 percent of the electricity, and pumping for 15 percent. .

Studies show water and wastewater treatment facilities can save in the range of 15 to 30 percent of energy use by optimizing systems with market-available, efficient technologies. Some strategies include:

- Optimize motor and pumping systems with premium efficiency motors, VFDs, and controls
- Replace inefficient motors
- Replace coarse bubble with fine bubble aeration
- Use efficient lamps in ultraviolet disinfection processes

PG&E will implement the Water/Waste Water sub-segment component with in-house resources as well as potential Third Party implementers who may deliver whole program elements or specific targeted services. Elements will include water/waste-water specific integrated education and training seminars, audits, benchmarking, incentives for retrofits and new construction performance improvements over standard practices, and technology demonstrations.

Marketing Strategy:

PG&E will use traditional marketing channels (assigned PG&E Account Service Representatives), third parties, and projected water/wastewater system retrofit and construction planning information to target program marketing. In addition, PG&E will partner with the following to deliver program information and services to water systems and waste water treatment plants:

- Water Agencies and Water Districts
- The California Water Environment Federation
- Local community based organizations, local government agencies, and Local Government Initiatives
- EPA regional offices
- California Energy Commission related programs
- Water and Air Quality Management Boards
- Water agencies
- Potential Third Parties

Industry growth projections and customer billing data will help identify program opportunities.

Information, Education and Training Seminars:

Education and training for Water District and Waste Water Treatment stakeholders will consist of workshops, seminars at conferences, and the availability of crosscutting technology classes delivered at the Stockton Training Center, The Pacific Energy Center, as well as in other targeted opportunities.

- Integrated education and training seminars will cover energy efficiency, demand response/reduction and self-generation opportunities
- Short integrated seminars will be coordinated to be held at water/wastewater 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 industry stakeholders along with other customers

Water/Wastewater Retrofits and Incentives

Water/Wastewater customers will be provided project support and both calculated and deemed financial incentives to undertake energy efficiency projects targeting the following efficiency improvements:

- Variable frequency drives

- Premium efficiency motors
- Influent pumping/elevation design
- Fine bubble aeration
- Low pressure UV disinfection

DG and DR potential in Water and Wastewater treatment

Water and wastewater treatment plants can be excellent candidates for demand response, time-of use management, and self-generation/co-generation opportunities.

Target Demand Reduction

- Planned shift in loads on critical peak days
- Turn off all non-essential process and pumping equipment
- Install system controls to support peak reductions
- Other opportunities should be investigated further
- Allow for use of internal combustion equipment by permitted municipal agencies for duration of curtailment

Target Distributed Generation Technologies

- Capture wastewater off gasses for co-generation.
- Methane Digesters for generation or cogeneration
- Solar pumps for water irrigation or sludge pond aeration

Demonstration Opportunities

- Methane Digesters
- Solar pumps for various uses
- Wind Turbines
- Use of storage tanks for water pumping to shift load

**Program Partners and Stakeholders**

PG&E will also coordinate state and national efforts (CEC's Public Interest Energy Research, the Environmental Protection Agency's ENERGY STAR<sup>®</sup> program, the Compressed Air Challenge). Trade associations (e.g., Industrial Manufacturer's Association, Association of California Water Agencies, Silicon Valley Leadership Group, the Association of Facility Engineers) will be linked into the entire package for education, outreach, and lead generation. Additional financing may be offered if feasible.

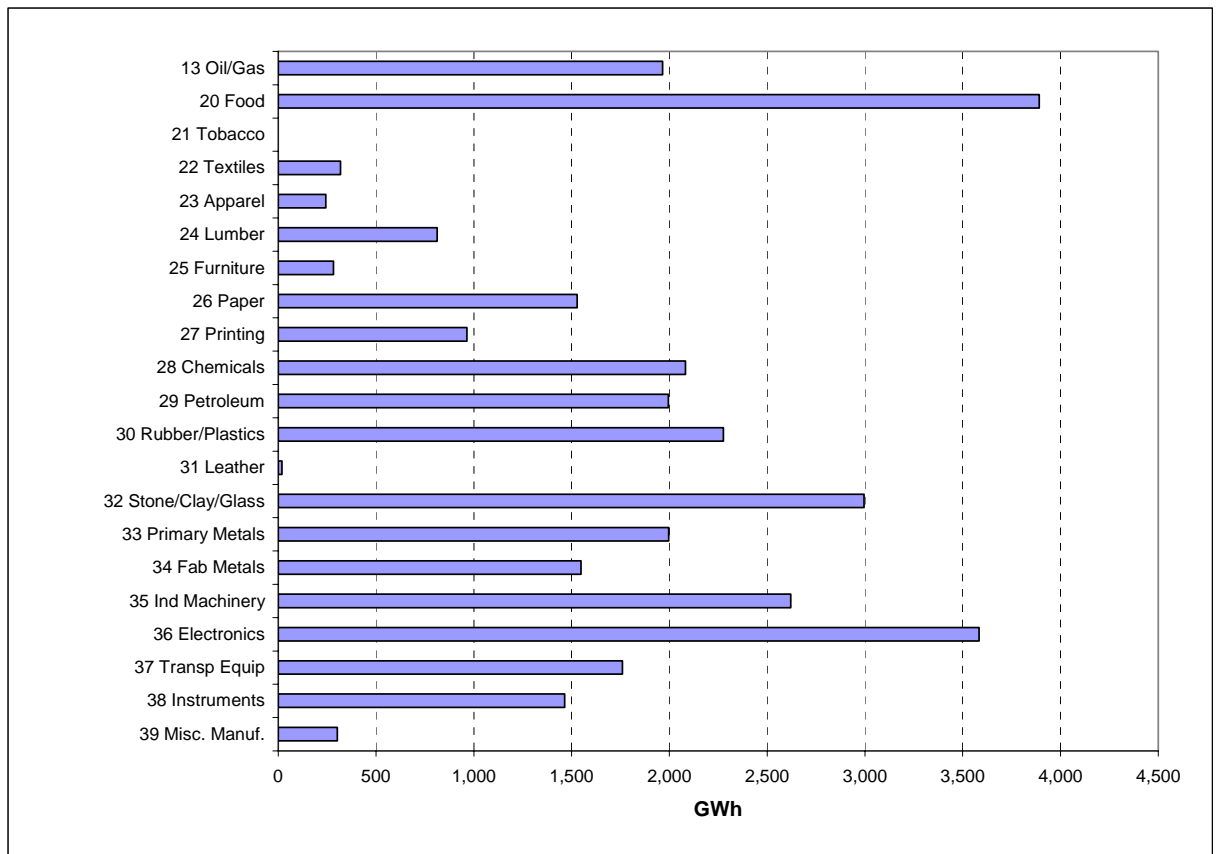
For Water and Wastewater Treatment program development and implementation, PG&E will work with the Consortium for Energy Efficiency's new National Municipal Water and Wastewater Facility Initiative, which is a national effort to share utility program best practices and resources and to develop a centralized location for these materials.

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, seminars, advertisements, direct mail, articles, bill inserts, point of purchase materials, trade shows) will be used as appropriate to both inform the general customer audience and to appeal to sub-sectors. Particular emphasis will be placed on Web-enabled information and assistance.

**11. Customer Description**

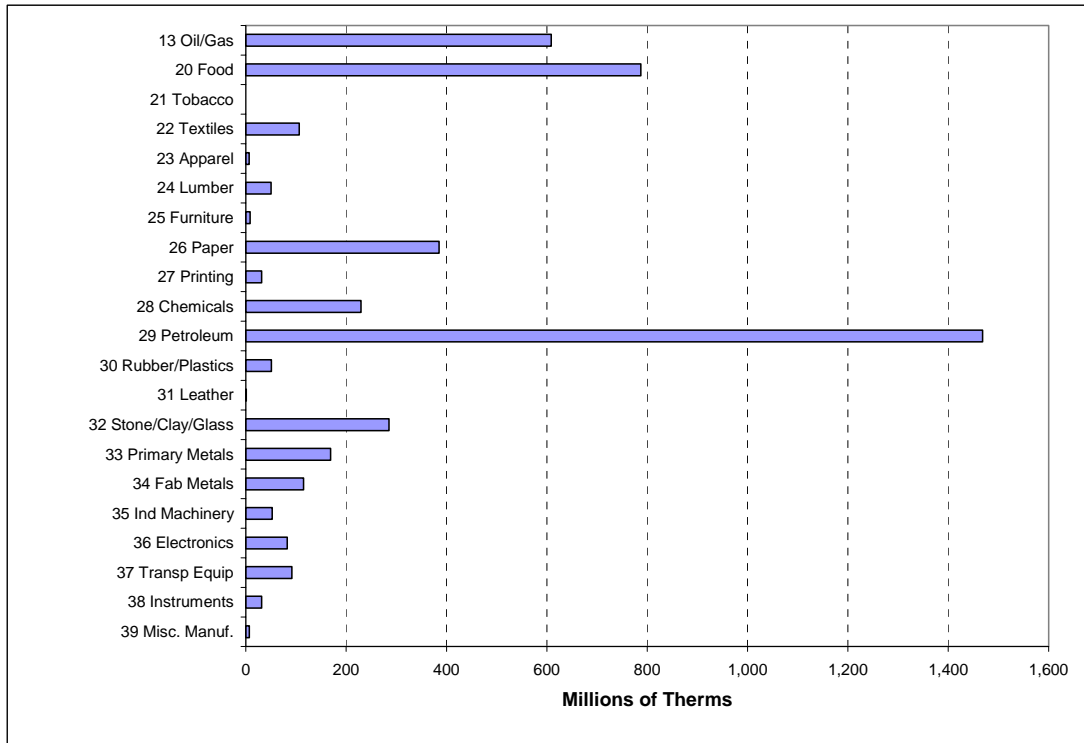
This program includes customers from the fabrication and heavy industrial segments of manufacturing and from process industries including printing plants, plastic injection molding facilities, component fabrication, lumber and paper mills, cement and quarries, metals processing, petroleum refineries, chemical industries, assembly plants, and water and wastewater treatment plants. Relative energy use by sub-segment is detailed below.

Natural gas consumption figures are shown in Figure E-3. Petroleum refining (SIC 29) is by far the largest consumer of natural gas. The next five largest consuming industries (20 Food, 13 Oil and Gas, 26 Paper, 32 Stone, Clay, and Glass, and 28 Chemicals) all use over 200 million therms per year each. These six industries account for over 80% of industrial gas consumption.



**Electric Consumption by 2-Digit SIC Grouping**

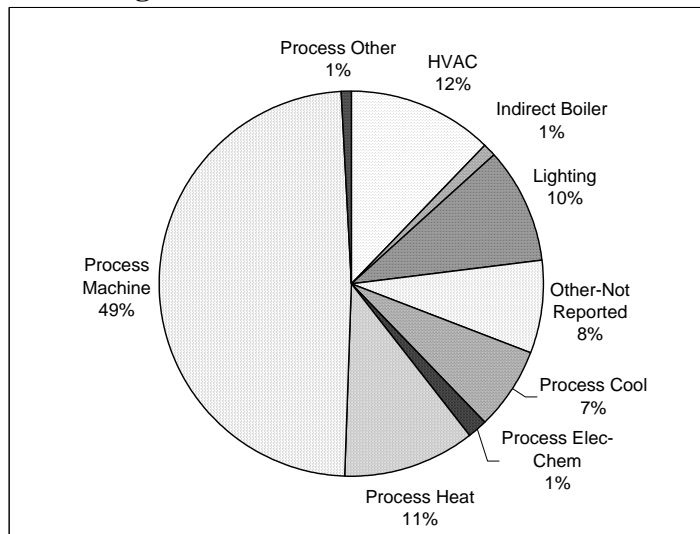
Source: PG&E 2001 Industrial Characterization Study



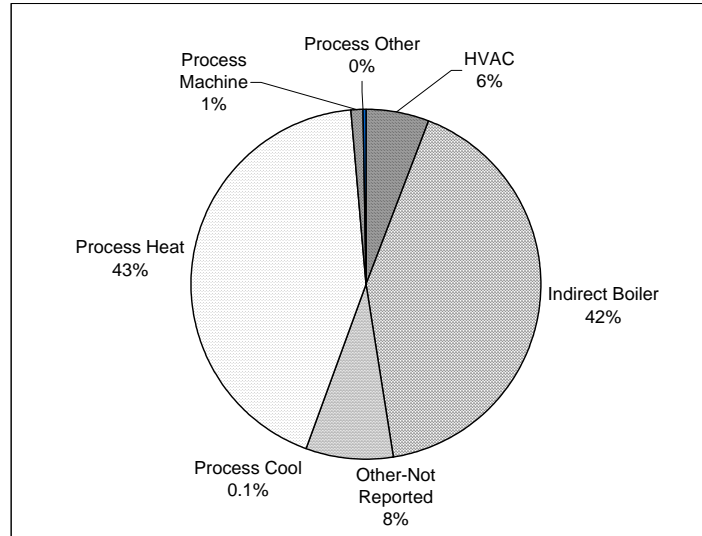
**Natural Gas Consumption by 2-Digit SIC Grouping**  
Source: PG&E 2001 Industrial Characterization Study

Electric and gas consumption by 2 digit SIC code is as follows:

**Manufacturing End-use Breakdown of Electric Consumption**



### Manufacturing End-Use Breakdown of Natural Gas Consumption



#### 12. Customer Interface

PG&E will employ multiple marketing channel efforts to inform Fabrication, Process, and Heavy Industrial customers and other players in the support infrastructure for this market of the program offerings.

PG&E dedicated program staff, in conjunction with industry technical consultants and third parties, will present the Fabrication, Process and Heavy Industrial Manufacturing program to the majority of customers included in this targeted segment. For smaller industrial or water facilities with non-process retrofit potential, PG&E staff in charge of Mass Market and statewide rebate program efforts may interface with the customers. Customers will also learn of the program through PG&E direct marketing efforts, sponsorships and educational seminars at industry events and conferences, through industry organizations, through co-marketing on complementary organization's Web sites and materials, and through trade publications. Additionally, the PG&E Web- and phone-based Clearinghouse will provide both general and targeted program information for industrial customers and easy access to program participation.

#### 13. Energy Measures and Program Activities

##### 13.1 Measure 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 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

As noted in Section 7 and elsewhere, PG&E plans to feature prominently activities around benchmarking, commissioning, retro-commissioning, emerging technologies demonstrations and codes and standards in its approach to this market. Generally, the PG&E will seek to institutionalize these activities in a manner appropriate for this sector and its energy efficiency needs.

The program will make extensive use of PG&E's existing infrastructure around education and information, including integrated energy audits. Likewise, the program will work to take advantage of and help shape offerings from the Pacific Energy Center and the Energy Training Center in Stockton. PG&E plans to leverage efforts available by way of cooperation with the US DOE, the EPA and the CEC (especially the PIER program).

#### 13.3.1. End Use Load

Incentive levels for the targeted market programs are being developed to reflect current market conditions.

Pumps, motors, compressed air systems as well as boiler controls and process heating.

#### 13.3.2. Targeted Sector

Fabrication, process and heavy industrial manufacturing customers, including water pumping, water treatment and wastewater treatment.

### 13.3.3. Activity Description

A comprehensive list of program activities as related to program design is detailed in Section 10. In brief, these components include:

- Close coordination with industry experts for design assistance.
- Trade Ally Newsletter to provide information on new equipment and practices.
- Site-specific integrated audits.
- Seminars on recent industry and technology and system developments.
- Industry benchmarking.
- Industry-specific best practices and case studies.
- Project design assistance for new construction and expansion.
- Energy Efficiency, demand response, and distributed generation incentives and offerings
- Commissioning and retro-commissioning services.
- Demonstration of new and emerging technologies.

### 13.3.4. Quantitative Activity Goals

As required in the Energy Action Plan, Decision 04-09-060, the Energy Saving Targets Decision, Decision 05-04-051, and Policy Rules II.1 and II. 2, the focus of all activities in the program will be to promote and produce energy savings.

### 13.3.5. Assigned attributes of the activity

Appropriate end uses for fabrication, process and heavy industrial manufacturing customers.

### 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.

### 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.

The Fabrication Process and Heavy Manufacturing program has quality assurance verification activities and evaluations to ensure the program's efficiency and cost-

effectiveness. The project verification, review and quality assurance will be carried out by independent consultants. PG&E will review and quality-check consultants' reports and customers' applications. Independent consultants' evaluations and program tracking data will be used to assess the effectiveness of program intervention strategies in order to meet customer needs and overcome market barriers.

The program evaluation consultants will gather data during the program interventions, review and conduct quality assurance on the data. The independent consultants will also supplement the data as needed to carry out the analyses to determine the successfulness of the program.

For measurement of energy savings, a detailed EM&V plan will be developed by an independent consultant that will select methods that are consistent with the currently adopted measurement rules at the time the detailed plan is developed. Either in this evaluation or in an over-arching statewide study, the ex ante energy and demand savings estimates will be reviewed, and new ex post estimates will be developed if additional measurement is needed to assure accurate savings estimates. Savings estimates will be updated to reflect the best available information, as needed.

- **Process Evaluation:** This task will include evaluation of program delivery mechanisms, marketing and delivery channels, timelines and customer satisfaction. The research will provide ongoing feedback and guidance on program implementation through customer behavior and market actor studies. It will measure indicators of the program effectiveness. Surveys undertaken as part of the process evaluation are likely to include participating and non-participating customers and trade allies.
- **Market Assessment and Customer Behavior Analysis:** These tasks will assist in assessing customer awareness, behaviors and practices given their participation in the Fabrication Process and Heavy Manufacturing program. The data used will be drawn from the process evaluation survey of customers and from the verification data collected. 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
- **Interim Impact Assessment and Feedback Analyses:** These tasks will provide ongoing feedback to program managers on the impacts being achieved. The analyses will let the program managers know early what measures are capturing large savings opportunities and what are not progressing and recommend timely program changes.

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

The Fabrication Process and Heavy Manufacturing Program will adopt a inspection plan to ensure that calculated measures are installed and operational. One hundred percent of the participating calculated projects are verified during an on-site visit as soon as a facility is substantially complete.

The inspection plan for deemed measures, if any, is addressed under the Mass Market Filing.

#### 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, trade shows, direct mail, and articles in industry publications) will be used as appropriate and as detailed above. Particular emphasis will be placed on Web-based information and assistance.

#### 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 Commissions 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\\_group/](http://www.pge.com/rebates/program_evaluation/advisory_group/).