

**PGE2005 HIGH TECHNOLOGY FACILITIES**

2006 - 2008

1. Projected Program Budget	\$11,6918,967
See Tables in Attachment III for components	
2. Projected Net Program Impacts	
MWh	46,659
MW (Summer Peak)	6.901
Therms	66,597
3. Program Cost Effectiveness	
TRC	2.66
PAC	2.67

Notes: Gas savings forecast impacts are incorporated in the Mass Market, Agriculture and Food Processing, and Fabrication, Process, and Heavy Industries programs.

4. Program Descriptors

Market Sector: Biotechnology, electronics manufacturing, and telecommunications data center customers

Program Classification: PG&E

Program Status: New Program

This new program targets high technology facilities and their unique energy utilization needs using both PG&E and third party industry specialists to deliver a range of energy efficiency services. The Program will address greenfield new construction and facility expansion and renovation as well as ongoing daily facility operation. The Program will incorporate statewide financial incentive elements as well as elements specifically targeted to and customized for the high technology customers in PG&E's service area.

The High Technology Facilities 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) Data Center Cooling Control, Quantum Energy Services & Technologies, Inc. The consultant proposes to focus on the installation of advanced controls and variable frequency drives to improve the energy efficient operation of HVAC systems serving data center environments. While this is not a comprehensive retro-commissioning or retrofit approach to data centers, it does provide a valid means of engaging data center customers in energy efficiency activities. PG&E plans to leverage the activities of the

consultant by encouraging customer participants to consider further efficiency measures using other segment offerings.

It also integrates portions of the following partnerships:

a) Silicon Valley Leadership Group Partnership

Members of the Silicon Valley Leadership Group (SVLG) will be offered an integrated program through this partnership, featuring the installation of energy metering and monitoring equipment, identification of retro-commissioning measures, completion of retro-commissioning measures, and the identification and installation of retrofit measures. It is expected that qualifying projects will likely comprise predominantly office space uses for SVLG members rather than purely high technology activities such as data center operations or technology research and development laboratories or manufacturing. PG&E will coordinate activities with SVLG to ensure that the full portfolio of IDSM offerings is promoted to SVLG members, leveraging the influence of the SVLG.

5. Program Statement

This Program is designed to address the unique needs of high technology customers with a dedicated, targeted program focusing on their unique needs and establishing focused accountability within the portfolio for that sector.

In terms of formal classification, the main sub-segments addressed by this program include:

- Biotechnology facilities;
- Pharmaceutical facilities;
- Electronics manufacturing and support;
- Cleanrooms and mini-environments;
- Data centers (including server farms; and
- Telecommunications.

High technology facilities have unique, intensive requirements associated with heating, ventilation and air conditioning (HVAC). This key fact serves as the salient organizing principle for the Program. For the purposes of this Program, facilities that rely extensively on laboratories, cleanrooms, and data centers comprise the sector. The unique HVAC characteristics of this sector include one or more of the following:

- High load intensity per square foot;
- Unique control requirements for humidity and temperature owing to process requirements;
- Unique air cleanliness requirements; and
- Unique requirements for containment and exhaust of used air.

The specialized electrical power reliability and quality issues in this segment also are an organizing principle. Likewise, unique attributes around corporate cultures and employee work habits in this segment inform the need for a specialized program.

Many high technology facilities, particularly electronics firms in the greater Bay Area, have significant lighting loads as well as office equipment and other plug loads. Energy efficiency opportunities within these more traditional end use categories will be addressed by this program in conjunction with the Mass Markets and Large Commercial programs. Although the barriers to implementation for these systems can be substantial, the industry needs for these end uses are not necessarily unique compared to those of other industries.

#### 6. Program Rationale

Addressing the barriers to adoption of high efficiency measures listed above for each of the High Technology Facilities sub-segments will demand a project-specific, customized approach in order to achieve success with the large customers that drive these markets including. Calculated and customized incentives, technology demonstrations, customer and vendor education, design assistance, building retro-commissioning programs, and benchmarking will be the key building blocks of this customized approach.

For new facilities, the rapid construction and expansion activity evident in the biotechnology sub-segment demands early entry into the facility planning and design process. Design assistance, demonstration projects, and customized incentives, particularly to promote adoption of emerging laboratory technologies, are the key. Early intervention will allow PG&E to reduce air conditioner use (particularly on critical peak days) while enhancing customers' power reliability and quality.

Although these facilities often have very high energy intensities on a square foot basis, it is also the case that these industries are high value-added, high revenue enterprises. As such, even though energy costs per square foot may be relatively high for this sector, such costs are not necessarily unique drivers or motivators for this segment. Accordingly, it is important that programs promote measures and practices in this segment which provide high impact and relatively large savings.

Power supply reliability is important to all business customers, but especially important to this segment. Accordingly, mission critical loads are often served by UPS systems

and backup systems; such systems are more prevalent here than in other segments. The particular dynamics of this situation—the need for high reliability and the high penetration of UPS and backup generation systems create special constraints as well as opportunities for PG&E program efforts, particularly demand response efforts.

The barriers to creating more efficient existing facilities such as server farms are similar to the adoption barriers for new construction in the High Technology sector but also demand a different focus in order to garner significant savings. Retrofit and retro-commissioning activities will play a more prominent role than greenfield construction design assistance or whole building renovation. Reconfiguring existing HVAC systems and operating the systems more efficiently are the keys to success. As with the biotechnology sub-segment, demonstration of new, successful approaches is needed to accelerate adoption of the new technologies and operational paradigms than can dramatically reduce energy use at server farms.

By focusing solely on these relatively narrow but high energy use and high energy potential slices of PG&E's overall customer base, the High Technology program managers and staff will be able to more effectively track and respond to industry trends, adjust the size or direction of the program within the portfolio and take full advantage of new technologies or practices across all customers in a specific segment of the market. This approach will also enhance and strengthen the relationships among contractors, industry specific consultants, end-use specific experts (e.g., specialists in air handling, cooling, or purification systems), trade organizations and other industry experts.

Coordinating the delivery of all services in the Program will help customers develop comprehensive, short-, medium- and long-term energy plans for their businesses. Coordinated delivery is also necessary in order to maintain the customer contact necessary to address new energy efficiency opportunities at individual customer sites as they arise, grow, and mature into actual customer projects.

## 7. Program Outcomes

The primary objective of the Program is to meet the energy savings target set for the Program and identified above in Section 2. All elements of the Program support this primary objective. PG&E also believes that several elements of the Program will have ongoing value for permanently changing the energy efficiency profile of this industry. Accordingly, there is high value in permanently establishing these elements as outcomes. These include:

- **Benchmarking:** PG&E will work with industry and industry stakeholders to initiate and institutionalize the process of energy benchmarking for high technology facilities;
- **Commissioning:** It is especially important that the unique, highly specific and energy intensive systems found in high technology facilities be installed and

operated according to design intent; this Program will emphasize the need for commissioning new high technology facilities and will provide specialized tools and assistance to do so such that commissioning moves toward becoming a standard practice in the high technology building construction;

- **Retro-commissioning:** Retro-commissioning requires more emphasis on building operations and operating staffs than commissioning, which focuses more on design and construction. Additionally, retro-commissioning lends itself well to the production of hard, measured savings based upon specific project implementation at an operating facility. PG&E plans to provide specialized tools and assistance for this activity in its effort to help establish it as a best practice in high technology operations;
- **Development of system measure templates for high technology:** To establish maximum leverage and transferability, PG&E plans to develop system measure templates which will establish consistent algorithms for analyzing energy efficiency measures that have broad applicability within high technology but which are far too complex for deemed savings programs and which may have non-energy attributes related to high technology applications which make them unsuitable for general use. These templates will have application beyond utility incentive program purposes;
- **Codes and standards:** By working in close cooperation with the Codes and Standards program, the high technology program expects to be able to accelerate the process of moving proven, established technologies and practices germane to the high technology industry into California's Title 20 (appliance) and 24 (building) energy codes. A key activity in this area will be the identification of key system baselines within the high technology market. Through codification, savings from proven, cost-effective measures are permanently locked in for the benefit of all; and
- **High technology energy efficiency infrastructure:** PG&E sees a need to develop, strengthen and expand the skills, capabilities and influence of the energy efficiency infrastructure for high technology, especially in HVAC. PG&E expects that the total effect of its integrated approach to the high technology market will help establish a professional identity for practitioners in this area.

## 8. Program Strategy

In brief, the concept of creating focused accountability on the high technology market constitutes the core strategy behind the approach. This focus drives a market-integrated demand side management (DSM) approach that will help meet the customers' needs by both encouraging and enabling much closer working relationships between PG&E, key customers, industry experts and other key stakeholders of importance and influence to those customers.

In general, PG&E's account representatives serve most of the large customers within this market directly, one-on-one. As such, the account representative network is a cornerstone of the Program delivery structure for high technology. PG&E will also work with organizations such as the Silicon Valley Leadership Group as a key strategy to deploy the High Technology program. PG&E also expects to leverage efforts from the United States Department of Energy (US DOE), Environmental Protection Agency (EPA) and California Energy Commission (CEC) (especially the Public Interest Energy Research (PIER) program) to help reach this market and create a critical mass of Program interest.

The strategy for providing program services will fall to PG&E and its contractors as well as third party market experts. They will provide calculated savings incentives as well as audits, self-generation information, demand response options, deemed savings rebates, and education and design assistance on the latest developments for managing energy. As noted in Section 7, PG&E will seek to institutionalize practices such as facility benchmarking, commissioning and retro-commissioning within this market with specialized tools in these areas for this market.

To the extent that codification of various equipment and design options proves to be feasible and practical, Title 20 and Title 24 serve as natural end points to lock in savings from established, cost effective practices.

As mentioned above, 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. This strategy is the key to making the new cohort of biotechnology facilities as efficient as possible.

This Program will focus on business owners, developers, facility managers, architects, engineers 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., biotechnology, data centers, data systems manufacturing, aerospace, pharmaceutical) and by cross market energy systems (e.g., HVAC, lighting, chillers).

Education, marketing and energy audits will be specifically tailored to the various high technology facilities 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 pre-determined with a simple calculation. In addition, calculated savings approaches capture interactive effects of different end-uses to maximize potential savings. This may be especially true in the more complex and varied workings of the high technology facility industry. Thus, the majority of savings for this market segment will be realized in calculated approaches. At other times deemed savings measure will provide 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.

#### 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 support the long-range sustainability of integrated DSM as a procurement strategy:

- Reduce Program participation barriers and customer confusion by providing a single, coordinated, target set of program offerings that focus on long-range customer business needs;
- Adopt best practices in program design and delivery from our statewide partners in California as well as other leading national energy efficiency programs;
- Ensure that the non-energy benefits of energy efficiency and integrated DSM are captured and promoted across all market segments to fully integrate energy efficiency in the marketplace;
- Wherever possible, align programs with existing and complementary industry, local, state and national efforts (energy efficiency, sustainability, industry productivity, water efficiency);
- Optimize existing facilities to improve California's long-term productivity and competitiveness;
- Optimize new construction design and specification practices among customers, architects, engineers and equipment vendors. Ensure that through education, training, and program interventions energy efficiency in California becomes standard practice;
- Educate customers, designers, and vendors on existing and emerging technologies through seminars, classes, case studies, and technology demonstrations and best practices design guidelines;
- Promote the education and facilitation of energy efficiency project sponsors;
- Where state energy codes do not apply, promote industrial best practices;
- Facilitate technology transfer across program categories and industries;
- Track program successes by establishing and continuously monitoring industry baselines and benchmarks on customer awareness, participation, satisfaction, and commitment to energy efficiency;

- Influence the high technology facilities to change energy use practices by providing education, training, benchmarking tools, and information to familiarize facilities managers and staff, their contractors and consultants with all new energy efficiency equipment and practices as they are developed. PG&E's long-range plan is to have educational institutions make energy efficiency integral to their long-term facility planning and daily operations;
- Work with equipment designers and manufacturers to accelerate the introduction of industry-specific high efficiency equipment such as high efficiency fan filter units, high efficiency computer room air conditioner (CRAC) units, water cooling systems for rack mounted equipment, and high efficiency laboratory fume hoods. PG&E intends to install and document the performance of three key high efficiency technologies that are poised to enter the market but have low adoption rates; and
- Promote specialized energy efficiency applications (e.g., fan filter units, waste heat recovery) applicable to this industry.

#### 10. Program Implementation

The 2006-2008 programs result from a reevaluation of existing programs, historical successes, and the needs of this highly specialized market. The resulting program uses a new and innovative approach to markets and delivery methods to maximize savings opportunities. The programs will have the flexibility to continue to evaluate and adjust based on successes and customer responses.

The market segment focus will allow program managers to integrate various demand side offerings into a tailored package of offerings most suitable to meet the needs of each particular submarket and the distribution of customer sizes within those submarkets. PG&E intends to employ extensive benchmarking activities using its extensive customer consumption database in order to facilitate the development of the best package of program offerings and to serve as a vehicle for continuous monitoring and improvement of customer energy utilization.

PG&E's high technology facilities account representatives and consultants will meet with customers to identify their specific energy needs including additional information/education on recent industry developments, site specific energy audits, energy efficient retrofit options, retro-commissioning, or new facility design assistance. Together they will develop a comprehensive energy efficiency plan which also considers options for distributed generation and demand response.

By combining previously stand-alone program 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 High Technology Facilities program elements that

are consistent on a statewide basis. PG&E will also work to adopt best practices from similar national IDSM programs.

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.

The following portfolio of products and services will be coordinated for target market segments:

1. **Education and Training.** The High Technology Facilities program will coordinate Education and Training activities to best meet the needs of the market. Education 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 the Education and Training program for target markets and will act as a continuous feedback loop for ongoing program refinement. The integrated Education and Training resources will include:

- a. **Energy audits.** On-site and other audits will be an element of the High Technology Facilities program. For instance, as the result of extensive discussions and an energy audit, a biotechnology laboratory might be interested in variable volume fume hood and control systems to regulate positive and negative pressures. PG&E would link the customer with the appropriate resources and provide assistance and would provide help to enroll in the program.
- b. **Benchmarking (by customers and by target industry):** Benchmarking and self assessment tools will be adopted or developed 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 customers to ensure that energy efficiency equipment functions as intended.
- d. **Emerging technologies and technology demonstrations.** Emerging technologies and demonstrations for High Technology Facilities customers will be delivered to the market through this integrated program.

- e. PG&E's Web- and phone-based information Clearinghouse will serve as a central, one-stop shop to deliver High Technology Facilities information and services, particularly for the numerous small- and medium-size electronics industry customers with standard lighting and HVAC needs. It will also coordinate relevant non-PG&E tools and resources that are relevant to the market.
  - f. Best Practices Design Guidelines, design briefs, and e-newsletters will assist customers, designers and contractors.
2. Deemed incentives. The High Technology Facilities program will assemble and deliver market-targeted information on PG&E's deemed savings rebates. The deemed savings rebate component is not expected to be a significant portion of the High Technology Facilities program savings delivery, as most will be calculated. Design assistance service will also be offered in conjunction with deemed savings rebate 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 such as Savings By Design to the extent possible.
  4. Demand response. The High Technology Facilities program will coordinate activities with internal demand response (DR) programs to integrate DR technologies and program offerings to better serve the customer and to minimize missed opportunities.
  5. Distributed generation. The High Technology Facilities program will coordinate activities with internal distributed generation (DG) program to integrate DG technologies information and program offerings, better serve the customer, and minimize missed opportunities.

The High Technology Facilities 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-segments of the Program. Vendors may also delivery energy savings as project sponsors through the calculated approach or through deemed savings. PG&E will remain the primary point of contact to coordinate the various program elements described above. The dedicated PG&E Program representatives will meet regularly with assigned High Technology Facilities customers, as well as partners and industry groups (e.g., Silicon Valley Leadership Group), to provide a continuous feedback loop required to track and adjust the Program as necessary.

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 programs. A portion of the Silicon Valey Leadership Group partnership will be funded by this market segment. This partnership will focus on the customers and end uses that offer the greatest opportunity for energy savings. This approach is optimal because high technology customers, through the SVLG, are in the best position to understand their IDSMS needs. 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.

PG&E and the Silicon Valley Leadership Group (SVLG) partnership program will work in close concert with the Hi Tech Integrated Market Planning Team. SVLG provides credible, ready entry into many customer organizations at a level where design decisions and comprehensive improvement efforts can be discussed, planned, and agreed upon.

PG&E will also coordinate state and national efforts (e.g., the California Energy Commission's Public Interest Energy Research, the Environmental Protection Agency's ENERGY STAR<sup>®</sup> program, Lawrence Berkeley National Laboratory/Lawrence Livermore National Laboratory). Trade associations (e.g., SVLG) will be linked into the entire package for education, outreach and lead generation. Additional financing may be offered if feasible.

The high technology facilities 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 niche markets. Particular emphasis will be placed on Web-enabled information and assistance.

**11. Customer Description**

The high technology facilities which comprise this segment include facilities which have extensive use in the areas of laboratories, cleanrooms and data centers. As noted, these facilities have unique, intensive requirements associated with HVAC; such requirements vary by sub-segment and are described in overview below in this section.

	<b>Annual Total GWh</b>	<b>Total Average Max MW</b>
Biotechnology facilities	783	156
Pharmaceutical facilities	394	64
Electronics manufacturing and support	3,840	669
Data centers	184	29
<b>Hi-Tech Total</b>	<b>5,201</b>	<b>918</b>

There are approximately 18,000 accounts which make up this segment. Not surprisingly, the roughly 400 accounts of 500 MW and above account for just under 600 MW of the roughly 900 MW in this segment. That is, just over 2 percent of the facilities consume about 65 percent of the electrical power. As noted, these large facilities are served by PG&E account representatives.

Geographical profile: Although there are high technology facilities throughout the service area, the main concentration tends to be in the San Francisco Bay Area, including Santa Clara County, San Francisco proper and the East Bay, as well as along the I-80 corridor through the Central Valley and into the Sierra foothills.

### **Electronics Manufacturing**

Electronics manufacturing is the largest of the high technology subsegments. While chip manufacturing has tended to move outside of the San Francisco Bay Area due to cost concerns, remaining plants are considered good candidates for cost cutting through retrofit and retro-commissioning projects.

About 300 large accounts (above 500 kW) produce just over 400 MW of peak demand, or about 65 percent of the demand in this sub-sector. The sub-sector features a fairly broad range of manufacturing applications including a wide range of instrument and component manufacturing, disk drive manufacturing and other specialized applications. Telecommunications facilities are included within this sub-sector.

The dominant HVAC characteristic of this sector is the need for cleanrooms which feature exacting specifications for air cleanliness, temperature and humidity. As such, special filtration and control equipment is prominent in this sector and creates significant power demand relative to conventional systems. High reliability for such systems is also an important factor since such systems are often characterized as being mission critical to the business at hand, which cannot operate if the systems are down or in some way compromised.

PG&E has conducted significant work in characterizing an energy baseline for cleanrooms. This study creates a starting point for the assessment of those factors which constitute good practices for these specialized HVAC (and related) systems. In contrast to systems for biotechnology and data centers, many of the measures in play for cleanrooms are well-known among practitioners of HVAC design and operation generally. However, owing to the special requirements of cleanrooms, the specifics of measure application are significantly different than is the case in conventional situations. PG&E's existing baseline efforts for this market form an excellent starting point for evaluation of calculated savings measures. Longer-term prospects for codes and standards treatment of cleanroom facility design may be feasible.

### **Biotechnology and Pharmaceuticals**

Biotechnology facilities and support industries are growing and represent significant existing and future PG&E loads that can be addressed through new construction and retrofit program elements. The top 40 to 50 accounts use more than half of the energy and peak demand in this sector—more than 100 MW—and will be the primary focus of program efforts. Much of the rapid growth of capital expenditures for new biotechnology facilities and renovation of existing facilities is expected to accommodate increased government and private support for stem cell research and related activities.

Particular attention will be afforded to wet lab improvements given the expectation that wet labs will be a substantial component of the biotechnology industry growth. Laboratory space HVAC loads tend to be much higher and much more specialized than those in comparable office and support facilities. Laboratory hoods, designed to capture and contain various by-products involved in the biotechnology industry, have considerable conservation savings potential that can be realized with careful design of key components, as PG&E as demonstrated with emerging technologies work in recent years.

There are also major opportunities for improvement of more conventional HVAC and lighting systems, particularly in new construction and major renovations. Early intervention and support is particularly important in the case when construction activity accelerates due to market pressures. Under those conditions, careful energy efficient design practices often give way to expediency and more rapid delivery of the completed project.

### **Data Centers and Server Farms**

As with biotechnology, data centers and data center load is growing and represents significant existing and future PG&E loads that can be addressed through new construction and retrofit program elements.

Data centers comprise a major sub-segment of the high technology facilities market. Such centers, also known as server farms, comprise almost 1,000 accounts using 480 GWh annually. The largest dozen or so accounts use more than 60 percent of the sub-segment's GWh and well over half of the peak demand for the sub-segment. (Note that these data are for dedicated data centers and do not include data centers contained within much larger, more general purpose facilities. The measures and approaches suggested, however, apply in either dedicated or non-dedicated data center applications.)

The salient energy need features of such facilities include extremely high cooling loads per square foot coupled with and extremely high need for cooling system (including electrical power supply) reliability (a six nine or 99.9999 percent reliability factor is

commonly quoted). These two needs—very high loads and reliability needs—speak to the need for a specialized services for this segment.

Physically, server farms are typically low-rise industrial buildings that house multiple rows of pizza box-sized server computers stacked in dedicated rooms and cooled with specially designed air flow regimes. For some facilities, the rapid industry growth in the late 90s led to construction of sub-standard facilities that are notoriously inefficient. Additionally, the designers tasked with designing cooling systems for these facilities perceive that cooling loads per square foot are increasing steadily.

Cooling design loads of more than 100 Watts per square foot are becoming common (this is in contrast to cooling loads in conventional buildings which are on the order of 5 to 10 Watts per square foot). These trends have lead to HVAC system oversizing actual loads of more than 50 Watts per square foot are rare (although still extremely high by conventional standards). In part, the oversizing is a function of future uncertainty regarding load density—building operators do not wish to be caught short on HVAC capacity.

Generally, chronically oversized HVAC systems tend to operate inefficiently, although there are not necessarily physical constraints which inherently require that this be true. Consequently, there are significant energy efficiency opportunities in data centers. PG&E has done significant work with emerging technologies in this industry in recent years. In this industry, the fact that the cooling loads are so high means that attention to operating details such as optimum use of outside air for cooling becomes critically important.

Achieving efficiency improvements while maintaining or improving all-important reliability is the key. Specialized industry consultants will continue to be used to deliver technical services to this sector.

Facility benchmarking against industry peers, retro-commissioning and continuous commissioning efforts will also be key strategies to address the needs of the high tech sector.

## 12. Customer Interface

PG&E will employ multiple marketing channels to inform high technology customers and other players in the support infrastructure for this market of program offerings.

PG&E senior account representatives and Program staff, in conjunction with industry consultants for each market sub-segment, will present the Integrated Markets High Technology Facilities program to industry customers. Customers will also learn of the program through PG&E direct marketing efforts, and through the Silicon Valley Leadership Group. The Quantum Energy Services & Technologies third party program will also play a significant role, although it is likely that PG&E and the SVLG will be

the major sources of customer interaction within the High Technology Facilities market segments. PG&E will ensure that its integrated market DSM portfolio will provide customers easy access to energy efficiency options as well as appropriate options 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 High Technology Facilities program calculator are based upon historic values from statewide programs such as Savings By Design. 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, PG&E will seek to institutionalize these activities in a manner appropriate for the high technology 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).

#### 13.4. 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 High-Technology Facilities 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 and 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 evaluation, measurement and verification (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 overarching 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 High Technology Facilities 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 High Technology Facilities program will adopt an 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 is addressed under the Mass Market program.

**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, 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.

**14. Conclusion**

This Market Integrated DSM program complements 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/).