

PGE2002 SCHOOLS AND COLLEGES

2006 - 2008

1. Projected Program Budget	\$47,087,967
See Tables in Attachment III for components	
2. Projected Net Program Impacts	
MWh	132,077,630
MW (Summer Peak)	25.93
Therms	3,0470610
3. Program Cost Effectiveness	
TRC	2.35
PAC	2.59

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: Educational institutions, including K-12, and colleges/universities
 Program Classification: PG&E
 Program Status: Revised Existing

The Schools and Colleges program coordinates a diverse portfolio of products and services designed to enhance adoption of integrated demand side management among the educational institution customers in PG&E's service area.

The objective of the Schools and Colleges 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 Schools and Colleges 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.

The program integrates the following third party offerings:

- a) D&R International is an existing 3rd party with an expanded role in 2006 through 2008. The main focus is implementing school building audits that were done in the 2004-2005 Program, along with doing new audits and assisting in implementation. It will also include small government facilities, such as libraries,

not covered by existing local partnerships. Incentives will be in the form of either installation support services or rebates. It also offers teacher/student energy education curriculum and activities; facility staff training meetings; and facility benchmarking.

b) D&R International's Campus Housing Efficiency Solutions program will initially focus on identifying opportunities within the larger campuses in PG&E's service area in order to address the issue that a small percentage of campuses are responsible for the largest share of energy consumption and peak demand in the higher education sector. The component would be open to all colleges and universities with on-campus housing in PG&E's service area and would primarily target older student residences with the greatest potential for energy savings.

The program also integrates portions of the following partnerships:

- a) California Community Colleges/IOU Partnership
- b) UC/CSU/IOU Partnership

The partnerships are being administered by a cooperative effort of the IOUs and respective colleges and consist of a comprehensive list of program elements including but not limited to retrofits, commissioning and retro commissioning, audits and education.

5. Program Statement

This expanded program serves the extensive schools, colleges, and universities market segment including public and private K-12 schools, public and private two- to four-year colleges, the University of California (UC) and California State University (CSU) systems, and campus student housing. All schools, colleges, and universities in the PG&E service area will be eligible to participate in this program.

The program design is based on the highly successful School Resources Program (SRP) that has served K-12 public schools since 2003 and the 2004-2005 UC/CSU/IOU statewide partnership program. SRP has evolved into a model that integrates seamless delivery of utility and state technical support and financial incentives programs to school districts. For 2004-2005, SRP had performance goals that were 300 percent to 2,000 percent higher than comparably-funded schools programs with similar performance categories; and in the first 18 months of the program has already exceeded its own performance goals by 105 percent to 250 percent. The UC/CSU/IOU Partnership has also been determined to be the customer-preferred method for delivery of analytical and technical services to that sub-segment. Both programs have demonstrated the ability to overcome market barriers represented in this market sector.

Enhancements to program design, scope of services, and delivery methods will be incorporated for 2006-2008, based on findings from the previous PG&E program

experiences, California Public Utilities Commission (Commission) evaluations, and recommendations from school and university facility planners and managers. The program will integrate technical services, investment-grade new construction and retrofit recommendations, financial incentives, faculty and staff education (behavior change), operations and maintenance (O&M) opportunities, energy policy planning, and student curriculum and activity programs to achieve its goals.

For 2006-2008, two- to four-year colleges will be included in the program; independent private colleges in the PG&E service area will be supported through a program design similar to that of the SRP, while selected public colleges will be supported through a statewide program design similar to the present UC/CSU/IOU Partnership but coordinated with the Office of the Chancellor of California Community Colleges.

The market integrated program for schools, colleges, and universities will address energy efficiency over the full range of spaces and uses found within this market segment including classrooms, offices, libraries, gymnasias, pools, cafeterias, student housing, and special use facilities.

6. Program Rationale

While the energy savings objectives of the Schools and Colleges program are consistent with Commission and PG&E efforts to treat energy efficiency as a resource and promote critical peak load reduction, the program is provided focus by three additional social objectives:

- 1) Assisting schools to reallocate utility cost savings back into educational resources,
- 2) Enhancing the learning environment, and
- 3) Providing energy efficiency leadership by public example.

California schools are, in general, in dire economic straits. Energy cost savings can have a significant positive influence on budgets and improvements in the educational process.

Energy efficient equipment retrofits have also been shown to improve lighting quality, thermal comfort, acoustics, ventilation, indoor air quality, and occupant control, thereby improving the learning environment.

The Program addresses several prominent legislative agenda concerns including statewide electricity and natural gas demand, associated environmental issues, climate change legislation, energy supply shortages, the school budget crisis, government buildings energy efficiency mandate, school facility improvement and equity, Million Solar Roofs, Sustainable Buildings Task Force, California Energy Plan, and others.

The enhanced program design will deliver electricity savings and demand reduction, and therm savings, according to stated performance goals. It will also deliver unprecedented customer awareness in this market sector.

There are 9,400 educational (i.e., school, college, *and university*) electric accounts in PG&E's service area. They represent over 2,100 GWh annual electricity consumption. Primary and secondary schools account for 60 percent of the annual GWh consumption of this market segment, with higher education institutions (colleges and universities) representing the remaining 40 percent. The peak demand contribution is even more skewed toward primary and secondary schools with 75 percent of the segment total.

Primary and secondary schools comprise the majority of electric accounts within the schools and colleges market segment. The 8,169 school and related facility accounts are, for the most part, small customers (relative to colleges and universities). These accounts represent almost 1,300 GWh annual.

The slightly more than 1,200 college and university accounts consume approximately 830 GWh annually. Not surprisingly, the largest three percent of the college accounts comprise over 70 percent of the annual MWh consumption and 66 percent of the peak demand of this sub-sector. These include large private universities, the University of California (UC) campuses, and the California State University (CSU) campuses within the PG&E service area.

While the overall schools and colleges market segment savings potential (~ 100,000-150,000 MWh annually) shown in the 2001 market potential assessment conducted by KEMA is not an overwhelming percentage of the total segment consumption, PG&E believes that the savings potential is understated. Since the savings potential is calculated without recognition of the rapidly deteriorating facilities and restricted operational practices of schools (due to O&M budget constraints), it is clear that the true savings potential is increasing annually as older equipment cannot be replaced and as expected maintenance activities are deferred.

Key market segment conditions and trends demonstrate similarities across the primary/secondary school sub-segment and the college/university sub-segment. For example, both sub-segments are facing increasingly severe budget constraints. All of the California public schools, from primary/secondary, through the community college system, up to and including the UC and CSU systems, face tremendous operating budget constraints and layoffs of classified staff who previously supported facility planning, facility management, and maintenance and operations. Federal, state, and local revenue cutbacks severely hamper all public schools from implementing energy efficiency measures

This widely dispersed market segment tends to have mandated and limited budgets, single-year budgeting processes, constricted installation period schedules, a rapidly deteriorating infrastructure, and multi-layered, time-consuming decision-making

processes. First-cost considerations frequently outweigh the life-cycle cost advantages of higher performance energy systems. The severe budget constraints also cause discretionary items such as higher efficiency energy systems with higher first cost, and energy system commissioning (for new construction and modernization installations), to be among the first items to be cut from construction budgets.

The market segment capital constraints, combined with a lack of O&M budget to train staff about energy efficient facilities design and equipment procurement and operation, demand comprehensive intervention by outside experts (utility staff, consultants and vendors). Reliance on financial incentives or information only efforts will not produce sufficient customer reaction to significantly reduce energy usage.

Schools

K-12 schools typically spend about 3 percent of their operating budgets on energy. Utility costs are the second largest expense for schools, after payroll. The PG&E 2004-2005 SRP was typically able to reduce school energy costs by 15-30 percent annually. These observations are in concurrence with U.S. Department of Education estimates that schools can save about 25 percent of their energy costs through energy efficiency. Behavior change alone can account for 5-10 percent energy use reduction but requires reinforcement and persistent messaging to be truly effective. Energy technology improvements and consistent application of good O&M practices typically demonstrates 15-25 percent energy savings which persists over time.

The impact of budget constraints on the introduction of energy efficiency measures is exacerbated by demographic changes. Expanding populations in the hotter, dryer Central Valley areas are stimulating the majority of new school construction and classroom additions. Historically, school and college energy loads were seasonal, based on the nine months of the typical academic year, but low during California's summer peak period months. Air conditioning loads are increasing rapidly as schools move to year-round schedules to accommodate enrollment demands, acquire low efficiency temporary relocatable classrooms (RCs), and accommodate increased community use of school facilities.

RCs will comprise nearly two-thirds of the new construction scheduled for K-12 schools in coming years. These are typically standard efficiency designs and represent significant savings potential if built to higher standards. There are currently an estimated 88,000 RCs in schools in California, with about 4,000 being added each year to meet immediate classroom needs and accommodate mandated class size reductions. Retrofit RC demonstrations conducted in 2004-2005 by SRP are indicating cost-effective energy-saving improvements to daylighting, lighting, HVAC, envelope, and controls systems that may find their way into RC improvement and new manufacturing opportunities. This program will work with Emerging Technologies, the California Energy Commission's (CEC) Public Interest Energy Research (PIER) efforts, and the Mass Market program to encourage pilot projects and incentives for RCs.

The need for hardship and emergency funds for renovation of older structures has made state bond funds available for defined construction improvements, and schools can typically use local bond funds to renovate or rebuild facilities. However, these seldom earmark funds specifically for higher efficiency energy systems and equipment, despite their lifecycle cost and performance advantages. Funds for operations and maintenance will remain very limited for the foreseeable future.

Market studies estimate that 75 percent of K-12 indoor lighting is energy efficient or not feasible for improvement. However, the SRP has identified many efficient sites with eight-year old, first generation T-8 lighting. Newer applications can save 12 percent to 23 percent more energy. Technology advances in high-bay (gymnasium) lighting have been largely overlooked by schools. HVAC systems and control devices can produce significant savings. Controls systems can improve operations beyond what is already in place. Computers, vending machines, compact refrigerators, and other plug-load devices are simple targets for energy savings. Energy used for food service operations also deserves more attention.

Most school districts and colleges are not constrained by Title 24, and, therefore, may bypass energy efficient practices. The Division of the State Architect (DSA) and the Office of Public School Construction (OPSC) are tightening their procedures, but in the past many school designs slipped past energy reviews. DSA is moving towards acceptance of Collaborative for High Performance Schools (CHPS) school performance standards for approval of all new school buildings.

Simply put, school facilities management staff do not have the time nor resources to develop proficiency in energy efficiency, investigate options, instruct and convince upper management, develop financing options, or implement installations without outside assistance.

Colleges and Universities

Colleges and universities face rapidly growing enrollment but small growth in the total number of new campus facilities to be built. Most current UC and CSU campuses are engaged in new construction for increased student populations and/or seismic retrofits but continue to function with stagnant O&M budget levels. The university systems must also address new state policies to reduce energy use in government buildings. The existing UC/CSU/IOU Partnership program will continue to address the mandated reduction in energy use among government buildings in California.

Other organizational barriers limit awareness of energy efficiency opportunities within the universities sub-segment. For example, dormitories, bookstores, and food service functions are typically operated independently of the academic campus (and sometimes by concessionaires). Their business approaches center on revenue generation rather than operation cost reduction. Energy efficiency is frequently overlooked as an operating strategy. The market barrier is to change the mindset of managers away from first cost / current profit to life cycle costing and higher profit in subsequent years.

As with the K-12 segment, retrofits conducted in 2004-2005 indicate cost-effective energy-saving improvements through daylighting, enhanced lighting systems, HVAC upgrades, envelope improvements, and controls systems. While two-thirds of indoor lighting is considered energy efficient or not feasible for improvement in colleges and universities, there is over 30 percent available for energy efficiency upgrades. Large high-tech/bio-tech laboratory space provides opportunities for emerging technologies within universities, but less so within the State College system.

While some college and university campuses have sophisticated staff dealing with energy and are quite motivated to reduce energy use, most others, particularly in private and community colleges, have no experience, mandates, or centralized systems for dealing with energy use. Community colleges have been largely overlooked as a target market for energy efficiency although the proposed California Community College/IOU Partnership will begin to address that submarket.

7. Program Outcomes/Objectives

- Meet the energy savings targets set for the program.
- Continued assistance provided to schools, colleges and universities to reduce operating costs by improving the energy efficiency of their existing facilities with new energy efficient equipment, operations and maintenance best practices, commissioning services, and energy management systems.
- Influence educational institutions to change energy use practices by providing education, training, and information to campus and district staff, their contractors and consultants, and facility design teams.
- Integrate demand response and information about distributed generation technologies into the overall program design.
- Develop infrastructure that will enable administrators and facility managers to continue demand side management programs with decreasing assistance from PG&E.

8. Program Strategy

The 2006-2008 program strategy results from a complete re-evaluation of existing programs, historical successes, the needs of the market sector, and the Commission's energy savings targets for 2006 and beyond. The resulting program component designs use new and innovative approaches to markets and delivery mechanisms to maximize energy savings opportunities. The programs will have the flexibility to continue to evaluate and adjust offerings based on successes and customer responses.

An integrated marketing and services approach is needed to achieve significant energy reduction for schools and colleges. The program will provide direct analytical,

technical, educational, informational, financial, and management support services at no cost to schools, colleges, and universities.

Market integrated DSM (MI DSM) considers energy efficiency, distributed generation, time-of-use, demand response, and energy conservation (i.e., behavior change and no-cost/low-cost) opportunities for each customer. Economic and non-economic benefits of higher efficiency equipment (improved light quality, thermal comfort, better acoustics, improved ventilation, longer product life/reduced maintenance, environmental impacts, etc.) will also be addressed in presentations.

California's schools, colleges, and universities are motivated to save energy, but have minimal resources to invest in savings actions and staff development. PG&E's strategy will be to continue to identify capital improvement projects and operational activities that will result in energy savings. The program will include customized financial support through performance contracts, rebates, procurement of retro-commissioning services, training, and technical and management support services.

Especially important in this market segment is to provide demonstrations of energy efficient technologies and program designs that can be replicated by other school districts or college campuses without PG&E assistance. The 2004-2005 SRP demonstrations of higher efficiency systems for 40 RCs are examples of this replication potential.

Wherever possible, PG&E will strive to deliver Schools and Colleges program elements that are consistent on a statewide basis. PG&E will also work to adopt best practices from similar national IDSM programs. The following portfolio of products and services will be coordinated for target market segments:

1. **Education and Training.** The Schools and Colleges program will coordinate analytical and technical education and training activities to best meet the needs of the market. These 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 members will serve as a conduit to give strategic direction to analytical and technical advisory services 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 audit activities will be an element of the Schools and Colleges program. Integrated energy audits will be introduced.
- b. **Benchmarking (by customers and by target industry):** Benchmarking tools developed in the 2004-2005 program specific to multi-campus school districts will be enhanced and applied to new school and college districts in 2006-2008. The data from the benchmarking tool directly assists districts to

- understand energy usage. The data is also being provided to Cal-ARCH, a statewide database of energy use by market sector.
- c. Commissioning and Retro-Commissioning; Design assistance and on-site evaluations and activities may be available, as appropriate, to the Schools and Colleges customers to ensure that major energy efficiency systems function as intended.
 - d. PG&E's Web- and phone-based Information Clearinghouse will serve as a central, one-stop shop to deliver Schools and Colleges program information and services. It will also coordinate relevant non-PG&E tools and resources that are relevant to the market (financing, grants).
 - e. Technology-specific and facility design training will be presented to facility managers and design teams.
 - f. Workshops for faculty and staff at all levels will be conducted.
2. **Deemed Savings Rebates.** The Schools and Colleges program will assemble and deliver market-targeted information on PG&E's deemed savings rebates. 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 such statewide programs as Savings By Design to the extent possible.
 4. **Demand Response.** The Schools and Colleges program will coordinate activities with internal demand reduction and response and load shifting programs to integrate DR technologies and program offerings, to better serve the customer, and reduce peak load throughout this market sector.
 5. **Distributed Generation.** The Schools and Colleges program will coordinate activities with internal DG programs to provide information on DG technologies and program offerings, better serve the customer, and minimize missed opportunities.

The Schools and Colleges program will utilize a team of internal experts and industry professionals, varying by market sub-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 of the Program. Vendors may also deliver 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 Schools and Colleges customers, as well as partners and industry groups, to provide a continuous feedback loop in order to track and adjust the Program as necessary.

The Schools and Colleges program will employ both deemed savings rebates and the calculated energy savings incentive mechanisms among colleges and universities. Deemed savings rebates and activities will be prominent with K-12 schools. Calculated savings incentives will primarily be used by colleges and universities.

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 elements have been accounted for in the Mass Market and Education and Training program. The Colleges and Universities partnership may be funded by this program.

In 2006-2008, this program will also:

- Promote energy efficiency throughout the educational sector. PG&E will work with chancellor's offices, school district administrators, state agencies, professional organizations, mass media, and energy industry representatives to provide technology information, case studies, and technical reports.
- Encourage the DSA and other plan review and funding entities to explicitly include high efficiency HVAC and lighting measures as part of their construction plan review processes and to include commissioning requirements to ensure systems operate properly.
- Establish opportunities for commissioning (of newly installed energy systems), retro-commissioning (of equipment not properly commissioned at the time of installation. This activity is also expected to have demand response impacts as the metering and monitoring associated with commissioning required will facilitate customer understanding of energy use and the ability to manage loads.

Schools

The successful approaches used in 2004-2005 will be carried forward and expanded in the 2006-2008 program for primary and secondary school districts and private colleges to enable the utility and the school district/campus to prioritize needs and respond to changes in new technologies and energy end use practices. This approach will allow PG&E, in conjunction with the schools/colleges and specialists, contractors and vendors to maximize near term energy savings as well as set the stage for continued adoption of high performance technologies and maintenance practices.

Colleges and Universities

The new California Community College/IOU Statewide Partnership will be based on the 2004-2005 UC/CSU/IOU Partnership administrative design. The California Community College/IOU Statewide Partnership will deliver services through Resource Conservation Managers (RCM) who will become energy managers for the various community college districts.

Since the UC-CSU-IOU Partnership parameters were established and fully functioning during 2004-2005, methods for needs assessments, services requests, activity scheduling, information delivery, data access, and monitoring activities are all in place. Since much of the needs assessment and most campus intervention strategies have been done, in 2006-2008 PG&E will introduce a design that will focus on technical service delivery rather than analysis. PG&E representatives will be assigned to work with each of the university systems as liaisons between campus needs and utility technical, incentive, and support components.

Energy-intensive special use facilities, such as computer labs and electronics, bio-tech, and medical research clean rooms provide opportunities for Emerging Technologies (ET). The ET program would also establish selected UC campuses as incubators for energy efficiency technology development.

The DSA removed language from the CHPS standard requiring commissioning, but this program re-introduces various forms of commissioning as an effective way for colleges and universities to realize lower energy use. If this aspect is successful, the program will present findings to DSA through codes and standards.

This program may also provide design assistance, educational materials, and tools for architecture and engineering students.

9. Program Objectives

Program objectives in 2006-2008, in addition to focusing on creation of immediate demand and energy savings, also include:

Schools

- Increasing collaborative activities with the CHPS, a collaboration of the major utilities and several state agencies to promote a new generation of high performance school designs that are resource efficient, environmentally sensitive, comfortable, healthy, well-lit, and contain the physical amenities needed for supporting quality education. CHPS develops planning and design guidelines and resources, O&M guides, draft construction standards, trainings, demonstration projects, and educational materials targeted at the school design community and school district staff.

- Encouraging and assisting DSA and other state agencies, architects and equipment specifiers, and manufacturers of RCs to improve designs and energy equipment to make relocatables more energy efficient. These efforts should concentrate on enhanced lighting technologies, higher efficiency HVAC units, and controls, and emphasize life cycle costing over first cost considerations.
- Continuing collaboration with the statewide Sustainable Buildings Task Force, CHPS best practices guides, CEC Bright Schools program, and other high performance schools advocacy and support groups in order to deliver services and information to a broader audience than would be achievable through this program alone.
- Assume PG&E's portion of financial support for the Collaborative for High Performance Schools (CHPS) and maintain Board membership.
- Assisting school districts to leverage Prop 47 / 55 bond financing and energy efficiency grants by providing design assistance for new construction and major remodeling projects.

Colleges and Universities

- Developing and implementing a series of monitoring-based commissioning projects that include demand response program attributes,
- Providing facility staff with energy efficiency and O&M best practices training,
- Creating an emerging technologies development effort specific to community college needs. This will include consideration of distributed generation projects (most likely photovoltaic (PV) or micro-turbines) that can reduce operating costs at community colleges while providing reductions in critical peak demands at such facilities,
- Continue development of improved maintenance practices for UC/CSU campus HVAC and building systems, and.
- Establishing methods to optimize energy efficiency in new buildings.

10. Program Implementation

This program will continue to deliver all components of the current Schools Resources program and develop new concepts for additional services to the schools sub-segment. It will also continue the successful approaches used by the UC/CSU/IOU Partnership, and integrate the two models in the new Colleges Statewide Partnership.

One example of cross-over of these programs will be to introduce retro-commissioning to K-12 schools. Retro-commissioning of major energy-using systems, jointly developed by the Universities Partnership and the California Commissioning Collaborative, is estimated to have energy saving impact persistence of five years or more. Few K-12 school districts fully commission new systems or have ever retro-

commissioned existing systems. In schools, energy intensity is widely distributed across many low-rise campus buildings. As a result, retro-commissioning has been considered too time consuming and expensive, but new methods are being developed to apply retro-commissioning to K-12 schools, and these new methods demand introduction to the educational institutions market segment.

PG&E will continue to provide retrofit incentives, design assistance, design incentives, and commissioning incentives, where applicable. The menu of program offerings will be expanded to include information about distributed generation technologies (micro-turbines, solar/renewable technologies, clean fuel combustion, cogeneration), and time-of-use, load management, and demand response programs.

Descriptions of the program components by sub-segments: K-12 and private colleges, Colleges Statewide Partnership, and UC/CSU Statewide Partnership follow.

Schools

For public schools (K-12) the program will work with state agencies (e.g., California Energy Commission “Bright Schools” program, Division of the State Architect, Office of Public School Construction and California Department of Education) and professional organizations (e.g., Coalition for Adequate School Housing and California Association of School Business Officials) to disseminate energy efficiency information.

The program will also track legislative agendas and funding opportunities such as hardship and emergency grants, the Williams Settlement, CEC low-interest loan offerings, self-generation incentives, and many other similar initiatives for use in target-marketing of energy efficiency and demand reduction services to school districts.

For new construction, PG&E will identify school districts that have been selected for Propositions 47/55 and local bond building construction bonds financing. Program representatives will introduce school facility planning staff and new construction design teams to CHPS, Leadership in Energy and Environmental Design (LEED) and EPA ENERGY STAR[®] resources and design review assistance. They will also discuss Prop 47/55 energy efficiency grant opportunities with qualified school districts; few school districts seem to be aware of this significant funding source.

For retrofit activities PG&E will conduct analytical services such as district-wide energy use benchmarking of all school facilities to identify atypical facility energy use patterns (i.e., energy hog buildings), followed by integrated energy audits of selected facilities to identify specific retrofit opportunities, project costs, and investment payback periods. The program will also include instructional walk-throughs with facility staff to identify low-cost energy savings opportunities as well as operational and behavioral changes that can provide immediate savings.

The program will deliver information, decision analysis, and application assistance to school business officers for a wide range of energy efficiency financing opportunities that most schools are not aware of, to minimize financing as a market barrier.

Workshops will be conducted on regional, district-wide, or individual school basis, dependent on the type, scope, and audience for each workshop. The 2004-2005 SRP developed a series of workshops for every level of school staffing: superintendents and business officers, facility managers, custodial and food service workers, teachers, and facility planners, in addition to energy and safety curricula for students. SRP recently introduced a vocational education program to assist with energy efficiency industry infrastructure development. Workshops and curriculum programs are effective in eliciting behavior change that reduces energy consumption in schools and residences. These efforts will be continued and expanded as appropriate.

Resource Conservation Managers and integrated energy audits will directly assist in identifying load shifting and demand response opportunities through advanced metering devices and more sophisticated operations planning, and options for energy system control response to critical load period announcements.

School Resources Component

The School Resources (SR) component will support public and private K-12 schools, and private colleges. The SR component is based on the concept of a Resource Conservation Manager (RCM) who becomes, in essence, a school district's energy manager. The RCM provides or coordinates a full range of analytical, technical, financial, educational, and management support services, including:

Analytical Services

- Rate reviews (including time-of-use and DR pricing options)
- District-wide benchmarking studies
- Energy efficiency audits (investment grade); integrated energy audits (includes energy efficiency, demand response, load management and distributed generation opportunities)
- Walk-through surveys with facility staff

Technical Services

- Technology retrofit recommendations and equipment specification
- New construction design assistance
- Energy efficiency demonstration projects
- Commissioning services

Financial Services

- Incentive programs
- Financing opportunities
- Financing application and documentation assistance

Management Services

- Operations and maintenance best practices guides
- District energy plans
- Energy policy and procedure templates
- Supplemental resource guidance
- Other managerial support as needed to ensure project construction.

Educational Services

- Workshops (for business officers, facility managers, teachers, and custodial/food service workers)

In the 2006-2008 program SR will assist in the delivery of integrated energy audits to provide information regarding DR and DG options (in addition to energy efficiency) to schools and colleges. Technical services will be expanded to include a greater number of benchmarking and energy audits than were provided in 2004-2005: commissioning and retro-commissioning assistance to K-12 schools and colleges, water conservation activities coordinated with municipal water districts that will also result in electricity savings (from reduced pumping and wastewater treatment), expanded assistance to food service facilities, and other services that will result in demonstrated energy reductions and cost savings.

Another innovation for 2006-2008 will be the development of the SR Lite continuing support service for school districts that do not need the full range of RCM services, or have been supported by an RCM in previous program years (2003-2005) and now need only intermittent assistance. SR Lite will provide on-going information services and back office support so that school customers can more directly access utility programs, incentives, and information. SR Lite will help school facility managers to squeeze additional energy savings out of facilities that have already made good progress, and are ready for more advanced options.

Colleges and Universities

Implementation details for the community colleges, CSU, and UC will be included in partnership plans. The partnership efforts for higher education institutions will follow the successful formula of the 2004-2005 UC/CSU/IOU partnership effort.

For community colleges the program will work with the California Community College Chancellors Office, Community College League of California, and the Foundation for California Community Colleges on energy program development and information dissemination. For UC and CSU, the program will work through the respective Directors of Energy and Utilities, in the Offices of the Chancellors.

Colleges Partnership

The PG&E portion of the Colleges Statewide Partnership will support public colleges in the PG&E service area. This statewide partnership is expected to follow

the model of the UC/CSU/IOU Partnership. The initial program focus will likely center on auditing of existing facilities, providing a categorization of improvement opportunities (using both calculated and deemed savings approaches), and creation of a funding schedule for improvements at campus facilities across the state. It is also expected that the retro-commissioning and operator training components of the ongoing UC/CSU/IOU will be replicated in the Colleges Statewide Partnership effort. Owing to the nature of the building stock for California's community colleges the program will focus on lighting and HVAC systems improvements. Demand response offerings will be considered in conjunction with energy efficiency upgrades with funding decisions contingent upon a combined assessment of energy efficiency, demand response, and distributed generation (in the few instances where it might be appropriate for a community college setting and where sufficient funding could be made available).

Universities Partnership

The PG&E portion of the UC/CSU/IOU Statewide Partnership will support public universities in the PG&E service area. The current UC/CSU/IOU Statewide Partnership efforts have identified a large pipeline of projects across the UC and CSU systems. Continuing to address the existing (and growing) list of projects will be the primary effort for the 2006-2008 timeframe. This will also include continued expansion and refinement of the commissioning and training efforts begun in 2004. The expansion of the program horizon over a three year timeframe will allow a more cost efficient scheduling of projects to coincide with other campus development and improvement activities. Demand response and distributed generation information will also be added during the 2006-2008 timeframe.

Integration with Other PG&E Programs

The integrated market sector-based approach will draw on other program resources, including:

- The Mass Market program will provide support for deemed savings measures promoted through standardized financial incentive activities. The Mass Market program will also provide assistance with new construction planning, such as coordination with utility technical and design assistance and incentive programs, and new national and statewide programs supporting development of high performance schools.
- Integrated energy audits will be offered to educational facilities that show savings potential and are willing to commit to the additional time and financial investments required for the more advanced equipment and operations changes. Standard energy efficiency audits will be offered to most program participants.

- Coordination with the Education and Training program will include co-sponsorship and co-presentation of technology and O&M workshops with the Pacific Energy Center, Energy Training Center, Web-based interactive workshops, and other venues.
- Emerging Technologies and CEC-PIER collaboration is expected to include pilot projects and market acceleration assistance for market-ready products in the general categories of daylighting, lighting, HVAC, controls, and building envelope improvements related to the Education sector.
- The Hospitality program coordination will focus on campus housing.
- Commissioning services will be continued to universities, and pilot-tested for schools and colleges to ascertain cost effective approaches and energy savings impacts.
- Codes and Standards coordination will attempt to introduce cost-effective energy-saving improvements into Title 24 and impact DSA and OPSC review processes for school construction.
- Demand Response (DR)

There are relatively few significant peak period demand response opportunities in K-12 schools, but more in colleges and universities due to their larger size, longer hours of operation, and special use facilities. In schools, energy use for core functions cannot typically be curtailed until after 3:00 p.m.; and summer school classes (excepting year-round schools) generally operate from 8:00 a.m. to 1:00 p.m. Schools are relatively small facilities dispersed throughout a community, requiring innovation in integrating DR control systems. SRP began introduction of demand reduction and response opportunities to schools in late 2004. Many typical demand reduction opportunities (reset thermostats, building utilization and scheduling, pump operation schedules, lighting reduction) are reviewed as a matter of course by the RCMs working with the schools.

Similarly, DR opportunities will be targeted in the Colleges and Universities Partnerships, particularly as part of monitoring-based retro-commissioning efforts where the controls to facilitate demand response efforts would be installed. Special use facilities (e.g., energy intensive laboratories, computer labs) are also of particular interest. PG&E believes that there is significant opportunity for demand response among California's colleges and universities, particularly given their need for operational cost reductions.

- Distributed Generation (DG)

K-12 Schools have tremendous interest in PV systems for grid-connected revenue generation, educational purposes, demonstration of environmental

stewardship, and visible evidence of community leadership. Unfortunately, most have insufficient financial resources to afford large systems, annual utility and state incentives have been fully subscribed before schools could organize applications, and tax deductions cannot be applied to non-profit institutions. Payback periods for PV tend to exceed the investment payback criteria of most boards of education, especially for items viewed as non-essential. This is unfortunate, as many schools have unshaded flat or low-slope roofs that would accommodate large PV arrays, and are unoccupied during the summer peak solar generation period (resulting in significant customer energy net gain and system peak demand offset). The SRP promotes energy efficiency improvements as a better initial investment than solar energy, but will continue to educate customers about PV and solar thermal systems as viable options for schools. SRP also investigates cogeneration opportunities at schools, especially as related to pool heating systems and central heating. SRP is currently observing six micro-turbine installations in a South Bay school district, and will consider findings for application to other schools in 2006-2008. SR will continue to work with the PG&E Self-Generation Incentive program, Solar Schools program (Corporate Communications) and BP Solar's "A+ for Energy" PV demonstrations, project grants, and curriculum development initiatives.

Colleges and Universities tend to have larger buildings with central plants that are more conducive to cogeneration opportunities. PV applications are also of high interest in these sub-segments. Several of the larger UC campuses currently operate cogeneration facilities. The CSU facilities are less likely to have installed co-generation systems given the nature of their gas and electric energy demand profiles. Opportunities for combining micro-turbines with absorption chillers will be explored where appropriate. Information about viable distributed generation opportunities will be provided to customers.

- **Collaboration with Other Agencies:** The program will also coordinate closely with the CEC's PIER program, Lawrence Berkeley National Laboratories (Building Technologies, Energy Analysis, and Indoor Environment Group), the California Lighting Technology Center, and manufacturers of lighting, HVAC, controls, and daylighting systems in the development and market acceleration of new market ready products to school districts and centers of post-secondary education. Examples may include indirect-direct evaporative coolers, low-flow laboratory vent hoods, dual-pane windows with integrated mini-blinds, higher efficiency HVAC systems, integrated daylighting systems, smart thermostats and lighting controls, and integrated classroom lighting systems. The School Resources component will continue its close associations with the Collaborative for High Performance Schools (CHPS), Energy Design Resources, California Energy Commission Bright Schools and Public Interest Energy Research

(PIER), the California Commissioning Collaborative, and state agencies including DSA, OPSC, CDE, DGS, and others.

- **Professional Organizations:** The School Resources component will continue to work with the Coalition for Adequate School Housing (CASH), California Association of School Business Officials (CASBO) the California Teachers Association CTA and other educator groups, National Energy Education Development (NEED), and manufactured building associations. New for 2006-08 will be Nor-Cal Solar Energy Association, water districts and regional associations, and others.

11. Customer Description

As discussed above in Section 6 there are 9,400 educational (i.e., school, college, and university) electric accounts in PG&E's service area. They represent over 2,100 GWh annual electricity consumption. Primary and secondary schools account for 60 percent of the annual GWh consumption of this market segment, with higher education institutions (colleges and universities) representing the remaining 40 percent. Primary and secondary schools comprise the majority of electric accounts within the schools and colleges market segment. The 8,169 school and related facility accounts are, for the most part, small customers (relative to colleges and universities). These accounts represent almost 1,300 GWh annual.

The slightly more than 1,200 college and university accounts consume approximately 830 GWh annually. Not surprisingly, the largest three percent of the college accounts comprise over 70 percent of the annual MWh. These include large private universities, the University of California (UC) campuses, and the California State University (CSU) campuses within the PG&E service area.

12. Customer Interface

The Schools and Colleges program, particularly the K-12 component, will be presented to customers primarily by PG&E program representatives as well as industry consultants and contractors/vendors of energy efficient equipment. The college and universities component will begin to be presented to customers via college and university staff trained through the partnership program education and training efforts.

Customers will also learn of the program through PG&E marketing efforts and in trade publications. The market integrated DSM portfolio will provide customers easy access to energy efficiency options as well as appropriate options for demand response and distributed generation.

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 calculator are based upon historic values from statewide programs such as 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. No Non-energy Activities

13.4. Subcontractor Activities

PG&E's portfolio of programs may integrate new and existing third parties as well as partnerships into program components. The need for additional subcontractors will be determined at a later time. In addition to third party bid and partnership subcontractor relationships, PG&E anticipates subcontractor assistance for energy audits, commissioning, construction design reviews, workshop design and presentation, design of program materials, and other relevant services.

13.5. Quality Assurance and Evaluation Activities

PG&E will continue the level of quality assurance and evaluation of the present programs, similar to those conducted in 2004-2005 School Resources Program.

The School Resources Program has evaluation activities in place to ensure the program runs efficiently and cost-effectively. Independent consultants will carry out unbiased verification, review and quality assurance of projects. PG&E program administrators will also review and quality-check consultants' reports and applications. Independent consultants' evaluations and program tracking data will be used to ascertain the effectiveness of program strategies.

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 set of measurement rules at the time the detailed plan is developed. Possible EM&V activities to be considered for this program include the following:

- **Market Characterization:** In the fall of 2006 a market characterization study could be performed to assess the market size and attributes of private schools and colleges sub-segments. The timing of the study would be such that the program will have had some interaction with private educational institutions, made basic assumptions about their interests and capabilities to adopt energy efficient technologies, and the ability of the program to address their needs. Current assumptions about capital budgets as the basis for funding (vs. public school deferred maintenance and similar budgets), contracted M&O services (vs. classified staff), marketing approaches (professional organizations, etc.), and other topics could be tested in this previously underserved category. The study would provide market data to ascertain the opportunities for the private schools and colleges segment and how to design a program to capture these in the most cost-effective manner.
- **Impact Analysis:** Program team members should meet with utility Evaluations staff and CPUC EM&V contractors to determine methodologies for documenting energy savings as a direct result of the program interventions and other performance goals of the program. Impact analyses will need to be done early on for those components for which no ex-ante data exists or is highly uncertain. Results of such impact analyses will need to be made available to the program administrators to allow for ongoing enhancement of the program. PG&E will develop mechanisms for verification of third party savings claims related to this program.
- **Process Evaluation:** Similarly, criteria and methods for process evaluation should be established for each program component. Ongoing review of customer satisfaction of the Schools Resources Program will draw upon the 2003 and 2004-2005 evaluations, to focus on examining and enhancing new delivery mechanisms effectiveness to optimize program processes and results in a timely fashion.
- **Review of Ongoing (or New) Services:** Periodic reviews and customer surveys by program staff should be conducted to determine the value to the customer of 2004-2005 services and new services. This should include hassle factor assessments of customer difficulty in introducing energy efficiency measures. Quick quantification of impacts can be performed by Evaluations staff. Evaluations staff can also assist in estimating the levels of support or incentives needed for customers to find value in the measures and perpetuate them as policy / procedure.
- **Persistence:** Related to the latter three EM&V methods, evaluators will examine persistence of energy savings (by technology) and effectiveness of program representatives contacts with facility managers.

13.6. Marketing Activities

The schools and colleges program will be one component of PG&E's integrated marketing and outreach strategy. The primary marketing will be performed by PG&E market sector program representatives and Account Service representatives. Assistance may also come through referrals from the local government teams.

For the SR component, marketing will be made directly to school district administrators (typically chief business officers and/or facility managers). For the College and University Partnerships, coordination will take place through the respective Offices of the Chancellors. Additional marketing activities are also described above in Section 10.

14. Conclusion

This Market Integrated DSM program compliments the rest of PG&E's portfolio, contributes to the overall balance of the entire portfolio and is designed to achieve the Commission's energy savings targets. It addresses statewide energy concerns and the education sector budget crisis. It also provides effective, targeted messaging to specific audiences who will be likely to identify and act on energy efficiency, demand response, and distributed generation opportunities.

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/.