

**PGE2010 EDUCATION AND TRAINING**

2006 - 2008

1. Projected Program Budget	\$45,226,769
2. Projected Net Program Impacts This is an information only program	
3. Program Cost Effectiveness This is an information only program	

Note: The projected Education and Training program impacts are not included in the total portfolio cost-effectiveness calculations, but the projected program cost budget is included in the total portfolio cost-effectiveness calculations.

4. Program Descriptors.

These activities are being redesigned to support the new portfolio of integrated market demand side management programs that PG&E will be offering in 2006-2008.

<b>Program Activity</b>	<b>Pacific Energy Center</b>	<b>Energy Training Center Stockton</b>	<b>Food Services Technology Center</b>	<b>Energy Audits Bus. Custs.</b>	<b>Resid. Audits</b>	<b>Clearing House</b>
Mass Market-- Residential and Small Com.	E (Residential Architects)		E	E	E	N
Residential Contractor Training	E (facility use)	E				N
Commercial New Construction	E	E (facility use)	E			N
Target Market Business Segments	E	E (facility use)	E	E		N
Demand Response Training (non PGC)	E		N	E N		
Dist. Gen. Training (non PGC)	E	E		E N		

E = Existing program effort

N = New for 2006-08

5. Program Statement

Education and training are vital to most of the programs in PG&E's 2006-2008 portfolio. This program will build on the long history and success of the existing offerings including audits, training centers, and specialized technical support including the PG&E Pacific Energy Center, the Energy Training Center – Stockton, and the Food Services Technology Center.

Education, training, auditing and phone and Web information services are vital to all efficiency programs in PG&E's 2006-2008 portfolio. Though we are proposing significant changes in delivery methods and organization of activities, this program will build on the long history and success of the existing offerings including on-site, telephone and Web-based audits, the Pacific Energy Center (PEC) the Energy Training Center – Stockton (ETC), phone centers serving residential and nonresidential customers, Web and telephone information services that help mass market customers with energy efficiency. Enhancements will arise from more careful segmentation of markets and from the use of new and proven software technology based on business enterprise models.

The **Pacific Energy Center** has served the existing commercial building and new construction design markets for nearly a decade and a half with seminars, consultations, tool lending and information. Its seminar topics have focused on new technologies in lighting, HVAC, building envelope and controls and have been useful to all market segments as the first step in identifying technologies for application in their buildings.

Market segmentation allows PG&E, for the first time, to create topics which will address the application needs in each end-use area in each of the targeted markets. This means that topics such as Retail Lighting can now be tailored to that sector and its specific needs instead of more broadly covered by end-use technology topics. This is important since, in the final essence, it is how technologies are applied specifically that will lead businesses to take actions. Working closely with market segment leads, seminars will be created for the specific business needs.

**The Food Service Technology Center (FSTC)**, its application research, equipment testing and seminars, form a strong foundation for increasing efficiency in food service for the entire state of California. Its pioneering efforts in establishing food service equipment performance test methods have been used by end-users, manufacturers and developers of state energy codes.

*New for 2006-08*

- All PEC Classes will be simulcast--both live and on-line--starting January 2006.
- ETC/PEC will coordinate Title-24 compliance training in partnership with the CEC
- Client Management—moving training participants into other programs—will be a key objective of energy centers and audit programs.
- ETC will expand its HVAC Distributor Partnership to deliver mobile training.

The FSTC too will greatly benefit from PG&E's market segment program organization by tailoring its programs and services to the application needs of hospitals, educational facilities, restaurants and commercial cooking design consultants.

**The Energy Training Center—Stockton** will continue its quarter-century of training expertise by focusing on residential contractor training—perhaps the most important of all the markets for technical training. Training delivery partnerships with HVAC distributors will be expanded to enable the ETC to reach a much broader audience of contractors and will take advantage of the ETC's hands-on portable training capabilities.

The **Energy Audits for Business Customers** will also benefit dramatically from the targeted market segment program approach. As digital technology has improved, so have the possibilities for on-line and telephonic products to evolve tailored to the needs of segments—especially in the medium and smaller commercial sized customers whose application of new technologies and budgets vary from business to business.

The **Home Energy Efficiency Survey (HEES)** clearly addresses a lack of customer information about energy efficiency benefits by providing three comprehensive no cost energy surveys which, unlike other services or products, require customer participation and ownership for energy usage and behavioral patterns. Absent the HEES program, customers would be forced to search out information through a variety of vendors and service providers, who may be limited to providing information on one product or service. Under the HEES program, targeted customers will receive objective information on a multitude of energy products, energy services and available rebate programs. By coordinating with other program implementers to present information and energy saving recommendations that would encourage participation in the incentive programs, the HEES will target high potential energy savings customers such as those in the Central Valley cooling climates.

Energenius and the Energy Patrol

These student curricula offer students, teachers and the students' parents the opportunity to learn about energy, energy use and ideas for using energy more efficiently.

### **Clearinghouse Concept**

Paradigm shifts rarely occur but Business Enterprise Software has the potential of completely transforming interactions with the mass market through the **Clearinghouse** concept. The basic infrastructure provided by enterprise software also has the potential of transforming processing and reporting across all efficiency program activities.

PG&E currently serves its mass market customers well through telephone-based services and e-mail communications. PG&E's Web site has made much progress in

organizing technical information, program offerings (descriptions of incentives) and general utility information.

At its heart, the Clearinghouse effort suggests six important improvements in mass market delivery of energy efficiency services:

- A central repository for all program information;
- One place to call or URL for all efficiency information regardless of market segment, business type or specific program interest;
- Energy efficiency services/products customized to customers based on selection criteria such as location, rate schedule and business type (for mass market business customers);
- An accessible customer-data infrastructure for partners and vendors participating in PG&E administered programs to make working with customers easier;
- A customer record (database) that tracks participation in programs, interests and end-use technologies (refrigerator type, furnace type) by customer site that permit pushing information to selected customers as program developments and analysis indicate rich savings potential; and
- A back-end processing function that links front-end requests to fulfillment and record-keeping.

As with all paradigm shifts, moving to a fully-integrated approach to mass market customers will require careful study, thoughtful evaluation and solid economic analysis. It is worth the effort.

## 6. Program Rationale

Most program logic includes increased awareness and information in the chain which leads to the choice of higher efficiency. These activities consider the integrated development and delivery of the information (technical and non-technical) needed in the market-based programs at the center of PG&E's energy efficiency portfolio. Each place the program logic of those programs refers to an informational based training activity (audit, training, technical support), it is referring to an activity included in or connected to the components of the Education and Training area. This includes audits, training, and other targeted technical outreach.

Technical information is not only delivered through audits but also through a wide variety of specific trainings and classes in support of all programs. Many logic models assume the availability of the designers, architects, engineers, vendors, installers,

contractors and other technically skilled personnel necessary to incorporate energy efficiency into customer's daily lives. This is often not the case.

**Technical gaps in the marketplace** range from a lack of understanding of the state's Title 24 requirements by building inspectors to contractors' lack of ability to properly install high performance air conditioners. PG&E has and will continue to fill this gap with a wide variety of training. In the new portfolio model, these trainings will, over time, be focused on ensuring that maximum savings can occur. For example, trainings and program offerings have often been linked, but this can be improved. New material developed for trainings can be incorporated into audits (and the reverse). As PG&E examines this area, it will achieve increased savings.

Though all educational program evaluation studies indicate that participants in training programs use information obtained in sessions (current studies indicate that over 60 percent of attendees take action based on information they learned), the most current study of the Pacific Energy Center's Tool Lending Library (program year 2003) clearly establishes the link between information, measurement tools and measurable savings. That loaned measurement tools are a significant enabler to taking action only reinforces the notion that information alone can produce substantial real energy savings.

Demand for information is demonstrated, as well, by the robust attendance to training sessions experienced at both the PEC and ETC-Stockton. PG&E's phone centers take more than 400,000 calls each year. With few exceptions, most classes are fully subscribed at the San Francisco location and attendance on line is nearly equal to classroom attendance. Indeed, Title-24 on-line classes may be the preferred method for design professionals to gain knowledge about changing code requirements, and since these requirements are enforced state-wide, access to code training is hugely simplified when experienced at the participant's desktop.

That being said, the significant role that demonstrations play demand that classroom environments cannot be substituted with on-line training. Demonstrations greatly enhance both the speed and efficiency of the learning process. This is especially true for lighting classes, duct testing, and classes which require the participant to learn through practice—much of which forms the foundation of learning at the ETC-Stockton for residential and small commercial contractors.

It is clear that one-to-many training and customized energy audits cannot be cost effective for mass market participants because of their limited ability to create substantial savings in their own homes. Still, motivated residential customers deserve access to information that will allow them to make decisions which, in aggregate, can add up to substantial savings. For this reason, redoubled efforts in creating telephonic and on-line audits with increasing specificity to home and small business facilities will be developed.

The **HEES** program provides a comprehensive multi-lingual program approach. It is specifically designed to reach a wide range of targeted customers by offering three types of survey options: Mail In, On Line and In Home. HEES provides practical and applicable information customers can immediately apply to better understand energy use in their homes and to empower them to make educated decisions related to energy efficiency and equipment upgrades. This multifaceted approach recognizes that customers have distinct needs that may make one type of delivery channel more appealing than another. As a result, the HEES program is positioned to reach the largest number of customers with high energy-savings potential by providing more options for customer participation. All three delivery channels help customers understand how their behavior can affect energy costs, what steps they can take to improve their homes' energy efficiency, and additional resources and programs available to help reduce energy use.

With a high response rate between 18% - 22% for the direct mail solicitations, the HEES program continues to be popular with customers who can access information on energy efficiency and conservation in a variety of formats and languages. The program intention is to reach more mass market customers with the most to gain from energy efficiency and increase participation by making the survey available in English, Spanish, Chinese, Vietnamese and Korean.

#### 7. Program Outcomes

- Expand outreach, audits and technical information which increase concrete, savings-achieving actions by promoting rebated and other energy savings measures;
- Develop trainings which increase the design and installation of energy savings measures and equipment with or without ratepayer funded energy efficiency programs;
- Provide information and technical tools that support energy efficiency but also demand response and provide distributed generation information and options in a manner consistent with the Commission's adopted Energy Action Plan;
- Provide a fully integrated response to customer inquiries. Provide current information on energy efficiency, demand response and distributed generation; and
- Establish a clearinghouse of services to support customer education

#### 8. Program Strategy

At this stage in its portfolio design development, PG&E has identified several unifying themes in its pursuit of the activities described in this section. The existing program categorization inhibits effective leveraging of one activity by another, leading to a less

than optimal combination of activities. At this point these are presented together to show the interrelationships.

The activities in this program, often in conjunction with other programs in the portfolio, will increase effectiveness of informational offerings by increasing applicability to specific customers and take advantage of cross-activity leveraging (outreach, audits, training) as well as explore and exploit more effective channels including consideration of electronic participation and the use of specialized (often third-party) expertise.

### **Training Centers Overview**

Technical excellence and solid science form the foundation for the energy center efforts at PG&E. Uniquely positioned to serve as a conduit for new technologies to the market place, the energy centers' job is to evaluate the performance of new products both through internal efforts and external partners. There is much pressure to get it right when standing before practitioners who will be applying lessons learned from classes on their next project. Feedback is swift and serves as an important factor in developing excellent programs.

Senior staffs at each center work closely with a variety of partners in developing the content and educational curricula. Internal partners include the Codes and Standards and Emerging Technologies programs as well as other PG&E senior staff who develop technical performance evaluations and workpapers for rebate program measures.

External partners such as the Lawrence Berkeley National Laboratory (LBNL), the University of California, Berkeley Building Science Program, manufacturer R&D efforts, as well as the California Energy Commission's (CEC's) Public interest Energy Research (PIER) program and the California Lighting Technology Center, are essential to the process of bringing new technologies and applications to practitioners and end-users. The list of partners is extensive—as it should be. Our combined efforts produce exceptional results that prove their worth in each class delivered.

### **Pacific Energy Center (PEC)**

The PEC will continue to target commercial building design practice and operation with significant enhancements in education events and client management. These enhancements are intended to greatly increase access to technical and applications information as well as moving clients along to other more site-specific services.

Program enhancements for the 2006-2008 years include:

- **Starting January 2006, ALL** seminars being presented both at physical locations as well as on-line (where practicable) for greatest outreach and attendance and to reach hard-to-reach areas with greater numbers of offerings than possible through local training venues;

- Developing new cooperative channels for educational program delivery such as BOMA's Building Energy Efficiency Program (BEEP) to help reach small and medium sized commercial building customers;
- Continued integration of demand response and distributed generation classes into the curriculum that in turn provides customers with the tools and information to integrate DSM, demand response and generation into their facility decision-making;
- The development of a client management structure that feeds participants to more site-specific services such as consultations, audits, tool lending and incentive programs after they have attend training sessions;
- A new focus on Title 24 compliance (in cooperation with the CEC and the Codes and Standards program) through education with both the design community as well as building departments. This includes both new 2005 standards as well as acceptance testing;
- Major enhancements to the daylighting consultation efforts with the addition of the Overcast Sky Simulator which will facilitate accurate, numeric lighting levels from architectural model testing;
- Portable lighting demonstrations that will support better lighting educational efforts away from San Francisco; and
- On-line registrations for classes that allow clients to select according to their interests and locations and unifies all training offerings from PG&E programs such as the ETC Stockton.

In addition to the enhancements mentioned above, the key services at the PEC will also demonstrate a new sense of focus owing to the development of incentive programs tailored for specific markets.

The key services at the PEC will include:

Seminars and Workshops: both in the classroom and on-line will not only focus on end-use technologies such as lighting, HVAC and the building envelope, but will be tailored to the needs of specific market segments as described in other parts of this filing;

Displays and Exhibits: will be enhanced through their linking with supplemental fact sheets and graphics which will support better understanding of how technologies are actually applied in specific areas such as building lighting and retail lighting. Graphics and fact sheets will in turn be made available via the Web to users;

Showcases: both water and product showcases (lighting, HVAC and building envelope products) have drawn large audiences at the PEC including manufacturers of products and governmental water agencies and will continue to be offered;

Consultations: using all tools within the suite of PEC tools including the Tool Lending Library™, the Heliodon (beam-radiation studies), the Overcast Sky Simulator (for realistic interior lighting level prediction using physical models);

Tool Lending Library: will continue to expand and upgrade its library of over 5000 separate tools that allow designers and managers to measure and calculate savings from design as well as M&O changes. Enhancements also include more protocols for tool use (available on line) that give specific instruction on using tools and greater development of software for aggregating and calculating savings based on tool measurements. The Tool Lending Library will be expanded in detail below; and

Resource Center/Energy Library: this energy center library, the only one of its kind in California, will continue to expand its collection of technical and policy materials as well as make them more easily accessible via its On-Line Library functionality. The library serves all programs, including residential, commercial and industrial/AG.

### **Food Service Technology Center (FSTC)**

PG&E intends to fully integrate the FSTC into its applications research, auditing and training efforts in 2006-08. The FSTC will continue to integrate services that affect both the design of food service facilities and restaurants as well as their operation.

Underpinning this effort are the design, certification, and maintenance of over thirty food service equipment test protocols that allow for unbiased measurement of production capacity and energy efficiency. Before the establishment of the standard test methods, equipment manufacturers were free to offer unsubstantiated claims with regard to production capacities and energy efficiency, leaving customers unable to differentiate these attributes when making equipment purchase decisions.

The Center will continue to work with manufacturers to test equipment and build directories of test results, allowing commercial kitchen designers and equipment purchasers to make informed decisions.

Equipment tests are performed for manufacturers by the FSTC under two scenarios: the manufacturer pays for the testing and retains control of the results, or the test is performed at FSTC expense, and the results are reported publicly. Manufacturers typically choose the first option to support their product development efforts; once product development is completed, most manufacturers opt for public disclosure of test results.

Secondarily, many chain facility operators (franchise restaurants, supermarket chains) require independent performance and energy efficiency testing of equipment as part of their specification process, which is leading to an increased demand from manufacturers for equipment testing.

Equipment test results are made available to customers and facility designers through direct consultations with FSTC staff engineers, through the FSTC Web site and library, and through dissemination of equipment test reports. Industry publications such as Foodservice Equipment Reports increasingly publish energy efficiency and performance test results as part of their reviews of equipment and articles on industry trends.

The FSTC also offers training and education services comparable to the PEC and ETC activities, including customer seminars, design consultations, and energy efficiency site audits.

Finally, the FSTC performs a key function in supporting energy efficiency program design and the adoption of **codes and standards** for food service equipment. For example, the statewide Express Efficiency Program has recently added a slate of food service equipment measures as a pilot for 2005, with the intention of continuing incentives in 2006-08. The FSTC provided technical and market data leading to the development of the program requirements, and will work with manufacturers and distributors of food service equipment to ensure that they are aware of the new incentive measures.

Using FSTC equipment test data, the CEC has been able to adopt minimum energy efficiency standards for commercial food service equipment sold in the state; the federal Environmental Protection Agency has similarly relied on FSTC guidance in establishing Energy Star® ratings for several types of equipment. The EPA has not been actively seeking to add Energy Star® rating categories for the past few years, but is looking into standards for commercial cooking equipment that uses water (ice machines, steamers, dish- and warewashers). The FSTC continues to support these standard setting activities, and will continue to advocate for the adoption standards for new equipment categories.

### **Energy Training Center – Stockton (ETC)**

The ETC will continue to target mass market residential upstream or midstream market actors capable of exerting significant influence on the energy efficiency decisions of customers. In alignment with PG&E's new market-based structure, the ETC will expand its education and training activities to include small commercial mass market actors. This new approach will expand our focus on small commercial quality installations and products in recognition of the fact that contractors working in the residential sector are also likely to work in the small commercial sector.

Program enhancements for the 2006-2008 years include:

**HVAC Quality Installation Initiative** – A substantial training and education effort will be mobilized to support training of contractors in proper high efficiency installation methods. This project recognizes that a 35 percent reduction in energy use is possible through improved installation quality, and will further reduce the energy consumption of high efficiency equipment. Activities related to this initiative may include training support for the following:

- Energy Star HVAC Quality Installation Program
- Title 24 Quality Installation Codes
- NATE EE Q/I Certification Advanced Module

**HVAC Distributor Network Partnership** – In order to effectively reach more HVAC contractors, the ETC is developing training delivery partnerships with distributors throughout its service territory. To date, 14 distributors have held 37 sessions. In fact, one organization has set a priority to offer training support by building numerous classrooms at its facilities and the ETC will provide expert quality HVAC installation training modules through this training network.

**Mobile HVAC Training Capability** – Training for contractors requires hands-on learning to dramatically improve comprehension and retention. The Mobile HVAC Training project was piloted in 2005 to provide this learning experience in locations throughout PG&E's service area, and its use will be expanded in 2006-2008 in collaboration with the HVAC Distributor Network Partnership.

**Tool Lending Library Specific to Residential HVAC and Small Commercial** – Diagnostic equipment now required by California Title 24 building codes will be provided to enable HVAC contractors to immediately use the equipment they were trained at the ETC on prior to purchasing their own systems.

**Demo House / Hands-on Training** – The ETC's recognized 27 years ago that hands-on training is far more successful for trades people than classroom training alone; therefore, improvements to its demonstration house and training laboratories will be ongoing during this 3-year program period.

**Contractor-specific Training** – The ETC will collaborate with the deemed and calculated savings offerings to support realization of energy efficiency implementation by training the contractors involved in installing technologies covered in incentives.

**Sales Force Training for HVAC Distributors and Contractors** – Benefits energy efficiency technical, not just financial value; aimed at creating sales of high efficiency equipment.

**Title 24 Residential and small commercial training** – Supporting 2005 standards related to retrofits of existing equipment. Special emphasis will be placed on providing training support for contractors to deal with duct system testing certification and verification. The ETC will partner with Codes & Standards program by providing education and training implementation services to improve code enforcement.

**Support for Home Performance** – The ETC will continue its support for building performance contractors by providing “house as a system” based training offerings and partnering with Affordable Comfort, Inc. to conduct a regional version of its national conference in Northern California.

**Coordination Activities and Services Provided to Other Programs** – The ETC also provides training and education support for low-income energy efficiency programs, third party initiatives, and local government initiatives. This broad base of support for mass market efforts creates an economy of scale that lowers the cost for each individual program such as this one.

The key services at the ETC will include:

Seminars and Workshops – both in the classroom and in hands-on laboratory/workshops will focus on residential and small commercial mass market end-use technologies such as lighting, HVAC and the building envelope. The ETC will collaborate with the PEC to deliver on-line training when the subject matter lends itself to such a format.

Displays and Exhibits - will be upgraded and enhanced to directly support new technologies covered by deemed or calculated mass market offerings.

Showcases – ETC is considering a compressorless-cooling showcase to demonstrate state-of-the-art and commercially available ventilation and evaporative cooling systems.

Consultations – The technical staff at the ETC provides ongoing support to program managers, contractors and builders, energy code officials, home inspectors and other midstream and upstream market actors.

### **Energy Audits for Business Customers**

PG&E will improve delivery and performance by establishing partnerships and utilizing the expertise of outside consultants. This effort will be accomplished via competitive bids for several types of energy audits.

PG&E has developed a process of issuing RFPs for acquiring auditing tools and audit services for large integrated, mail-in, CD-ROM, wireless on-site and on-line audits.

PG&E will evaluate cost-effectiveness of incoming proposals and offerings and is planning to outsource a significant part of its audits.

Energy audits, specifically for larger customers, will be marketed using integrated demand side management marketing strategy and tactics, along with market sector based marketing campaigns.

### **Home Energy Efficiency Surveys (HEES)**

The 2006-2008 program is an extension of the existing offerings and is one of the primary tools to provide mass market customers with valuable information that assists them in understanding, controlling and reducing energy use in their homes. HEES will be designed to increase participation in resource programs in order to achieve energy savings goals. HEES uses three delivery channels:

- Mail-in survey. The written version of the survey, which includes targeted direct mailings, is available in five languages: English, Spanish, Chinese, Vietnamese and Korean. It provides residential customers with similar information as the on-line survey, in an easy-to-complete mail-back format. The mail-in surveys are sent to targeted customers with a pre-paid envelope and directions on how to complete and return the survey.
- Interactive online survey. The online survey is available to customers via the PG&E Web site and is available in English and Spanish. The interactive feature allows customers to obtain immediate results by answering specific questions regarding their home energy use online. This online survey only takes few minutes to complete and provides customers with an analysis of their homes' energy use as well as energy-saving recommendations.
- In-Home Survey. The in-home survey provides customers with a personal consultation and energy saving recommendations on site. The current In Home Survey is targeted to customers in specific areas who typically experience high air conditioning costs. The In Home Survey will continue to be coordinated with other energy efficiency programs such as the Local Government Partnerships and mass market HVAC programs to maximize its cost effectiveness.

Both the Direct Mail and On Line Survey are open to all eligible residential customers. The Direct Mail Survey is targeted based on energy consumption and climate zone in order to improve its impact. These tools help consumers understand how their behavior can affect their homes' energy costs, how to improve their homes' energy efficiency, and the additional resources and programs that are available from the IOUs to help reduce energy use. Since the HEES program helps mass market consumers understand what kind of actions should be taken in order to make their houses more energy efficient, it drives customers to invest in energy efficient products they would not have purchased if the customers have not completed the HEES.

All three of the HEES delivery channels are currently bid out to third party contractors for program implementation. PG&E plans to continue using third party vendors and is consistent with the PRG recommendation of bidding out non-resource programs.

9. Program Objectives

**Pacific Energy Center**

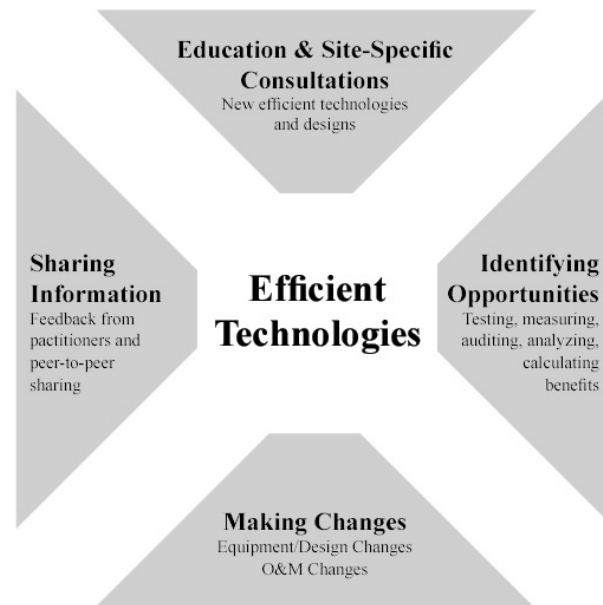
The objective of the PEC programs is to break down market barriers that keep customers from taking advantage of efficiency opportunities in their buildings. Most of these barriers are informational, since it is clear that efficiency changes generally provide a more rapid return on investment (ROI) than just about any other building investment. That is not to diminish the role that financial incentives play in getting customers' attention as well as providing an imprimatur to specific energy saving equipment and actions.

Designing educational programs that are specific to the application needs of market segments means presenting the right information at the right time and in the right package. The PEC will mirror PG&E's program design by responding to the needs of specific markets with educational programs that reflect customer needs.

**The PEC as an Entry Point to Efficiency Services**

Most customers will become interested in efficiency opportunities through a variety of channels: trade or professional organizations or publications, manufacturers' advertisements, word-of-mouth or educational classes. Though they generally look for specific answers to site specific situations, a multi-prong approach with a variety of opportunities for learning will be the most successful in getting them to take action.

PG&E sees educational classes as one of the most important first steps in introducing customers and market actors to the benefits of efficiency through the following services:



The PEC seeks to intervene in the marketplace to educate (seminars), help identify opportunities (Tool Lending and measurement protocols), calculate savings (calculation software), move clients to financial incentives offerings, and develop case studies based on participation in all previous efforts that can be shared with peers or become part of the next training curriculum cycle.

### **Creating Partnerships and Channels**

At the current levels of seminar production, the PEC is now dependent (and glad for it) on a variety of technical consultants and trainers in the Northern California markets. These include organizations such as HMG (for daylighting), RHA (fenestration/building envelope), Taylor Associates (commercial HVAC), Martyn Dodd (for Title 24) and LBNL (demand response programs); and the CEC (for Title 24 code compliance).

The PEC also provides training and a training venue for these same groups and local partnerships such as Silicon Valley Partnership and UC/CSU. The objective is to continue expanding this variety of providers in the coming three years where new requirements and competencies converge.

The PEC also sees a continuing role for our technical association partners such as the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), the Illuminating Engineering Society (IES) and local American Institute of Architects (AIA) chapters. These organizations both enable channels to customers as well as act as partners in the development of professional training. The PEC is currently a certified to provide continuing education credits for AIA classes (live and on-line) as well as the IES.

### **A Nexus of Efficiency Activity**

The PEC was the site for nearly 600 events in 2004 related to efficiency and other environmental efforts. This number increased in 2005 due to the greater involvement of third parties in the planning and policy process. They use the PEC as their principal location for these sessions in the Bay Area. The PEC will continue to provide the highest quality events services to facilitate the businesses of energy efficiency.

### **Food Services Technology Center**

The FSTC seeks to influence the broad food service industry, including manufacturers, customers, and codes and standards bodies, to support the design, specification, purchase, and use of energy-efficient equipment in restaurants and other food service applications. Because of the lack of market power among equipment manufacturers, and the diversity of food service customers (over seventy percent of restaurants are single-site operators), the integrated approach of the FSTC program is needed to address this market.

### **Energy Training Center**

#### **Influence the Mass Market Most Effectively**

In order for the ETC to impact millions of end-users in the mass market, it must focus its efforts upstream and midstream to utilize market actors as change agents to influence customers. Implementing training programs directly for customers is not cost-effective; mass market education and information for customers will be handled by Call Centers, Web sites, Home Energy Efficiency Surveys, and other venues.

#### **Quality Installation and Home Performance Support**

A core objective of the ETC is to improve the quality of installation of energy efficiency measures to optimize performance. A “house as a system” approach to improving efficiency, comfort, health and safety will be promoted through the course offerings at the ETC.

#### **Title 24 Code Compliance and Enforcement**

An additional key objective of the ETC will be to improve compliance with rigorous Title 24 updates that go beyond new construction to include revolutionary impacts on the existing housing market. The ETC will work with HVAC contractors and building departments to overcome information and training barriers to code compliance and enforcement.

### **Energy Audits for Business Customers**

Business energy audits provide multiple benefits to the adoption of energy efficiency changes and measures:

- Support achievement of sustainability in energy efficiency consumption, behavior and investment choices;
- Improve adoption of recommended measures and deliver energy savings
- Point customers to the relevant IOU incentives to overcome first cost barriers; and to local government partnership initiatives and third party energy efficiency programs;
- Conducting Integrated Audits to recommend and quantify the advantages of energy efficiency and demand response options;

### **Home Energy Efficiency Surveys (HEES)**

PG&E is proposing to accomplish a total of 50,000 residential audits during the 2006-2008 period. PG&E plans to claim energy savings for residential audits based on the results of a soon-to-be-finished study.

The infrastructure set up for the HEES program makes it possible to achieve the major goal for this program, providing valuable information that helps customers:

- Save energy and money;
- Make their homes more comfortable;
- Increase the likelihood that they will invest in energy efficient products when purchasing appliances, equipment and lighting;
- Learn about additional resources and programs offered by PG&E; and
- Discover additional resources and programs available to help reduce energy use; and
- Make the right decisions about replacement of their heating and air conditioning equipment.

## 10. Program Implementation

As current activities continue, steps will be taken to review and coordinate informational efforts across programs to ensure messages reinforce each other in form and content.

### **Training Centers**

Training and education will continue to fill gaps not being filled by other sources (private, schools) ensuring a skill base exists which can take advantage of energy efficiency opportunities. These activities will incorporate actions to raise energy efficiency in or out of programs. Training can also be linked to some forms of audits

(e.g., an audit of a commercial office building could include recommendations for specific training for building operations personnel).

### **Pacific Energy Center**

PG&E created the PEC to address deficiencies in the marketplace that resulted in energy-wasting buildings. Commercial buildings in particular, using nearly 40 percent of California's electric energy for lighting and air conditioning loads, were being designed and operated without regard for advances in either new technologies or techniques. The benefits of traditional energy-conserving building practices such as shading, daylighting, and natural ventilation were also being ignored. This should have come as no surprise; architects and building engineers and operators had few or no opportunities to learn about efficiency in either formal college education or on-the-job training programs. The PEC has become a trusted source of information and guidance that would empower individuals and businesses to make the decisions capable of creating the largest source of energy savings in the state. It impacts the quality of both new construction and retrofit projects throughout Northern California.

The PEC will build on its efforts with the many partnerships developed over the years—partners in government, professional technical associations, communities, research organizations, colleges and universities—to extend the PEC's reach and effectiveness. These will include the Building Owners and Managers Association (BOMA), and some of the local government partnerships.

Though information is available on the design and operation of energy-efficient commercial buildings, few organizations or forums function to help building professionals integrate, analyze, apply, and disseminate this information. This is precisely the role played by the Center. The Center provides technical training, consulting, design analysis tools, building performance measurement tools, equipment, and software, and information services fundamental to the design and operation of energy-efficient commercial buildings. On-line trainings will be explored as a vehicle to reach both traditional client groups and new ones (students, geographically dispersed customers).

The Center's goal has been to bring about permanent changes in design and operations practices to create more efficient buildings. PEC services foster these changes by exposing decision makers to the economic and environmental advantages of energy efficient design and new technologies. In addition, the PEC facility itself serves as a technology demonstration center and high-quality meeting venue for all efficiency advocates and implementers.

The PEC's Tool Lending Library has developed into a major resource informing and facilitating energy efficiency projects by providing easy access to the data needed to confirm potential savings. It supports many new construction and retrofit activities, and will likely expand into more commissioning or building operations activities.

For nearly 15 years, the PEC has targeted the huge commercial building market with trainings, consultations and tools to enhance understanding of new technologies and their application in specific designs—in a nutshell, overcoming information barriers.

Building-performance expectations of owners, developers and architects have also evolved during the last decade with the evolution of technologies as well as new, broader interest in green buildings. Though the definition of green buildings varies widely, the idea of a green building has captured the imagination of building owners, architects, engineers and the public. Many architects now advertise themselves as green and increasingly, building owners and developers are paying attention to clients' desires for buildings which are more sensitive to internal and external environmental issues. The development and interest in LEED (Leadership in Energy and Environmental Design) attest to this interest. The Governor's Green Building Initiative further reinforces this direction.

Above all else, green building issues focus on integrated design whose components include low-resource-impact materials, low energy use, using daylighting, control of waste, and on-site distributed generation. The PEC has played an important role through its variety of offerings to help customers and design professionals sort through the potential benefits of specific design and operational actions. Energy efficiency achieved through excellent building envelope design, integrated electric and daylighting, and super efficient HVAC systems with digital controls forms the strongest foundation for truly green buildings.

During the early years of the PEC effort, more emphasis in services was placed on market actors, architects and engineers, to do integrated design, particularly in the area of daylighting. Many of these efforts have been augmented by the Savings By Design program with financial incentives and the state's increasingly rigorous energy codes. These more rigorous codes beginning in the fall of this year will make additional demands on the new construction design market to meet requirements.

Historical efforts will continue but with an emphasis on new design tools, including both physical tools, such as the Heliodon and the new Overcast Sky Simulator, as well as computer design programs. The PEC will also focus on training to support compliance with Title 24 codes. and continue, as well, to develop in cooperation in the Energy Design Resources efforts (an on-line education resource for design teams), even more case studies that support efficient design practice in new construction.

By using the **heliodon** to study direct sunlight and its control, and the **overcast sky simulator** to evaluate daylight distribution and relative brightness of interior surfaces, architects can have much greater confidence in the success of their daylighting design in the finished building.

Opportunities to implement energy-efficiency design strategies occur over the full course of the design process from programming and schematic design through construction documents and construction. However, influencing early design decisions

regarding building siting, orientation, location of glazing, and access to daylight is especially important as these decisions shape long term energy use in building types that do not have exceptional internal loads. In recognition of this fact, the PEC will continue to offer a core set of educational programs that addresses building orientation, shading, glazing, and daylighting. These in-person trainings, typically between 3 and 6.5 hours in length, take place at the PEC. When the design of classes permits, classes will be made available to those in more remote locations via an internet simulcast.

In conjunction with the Savings By Design program and Energy Design Resources, The PEC will also provide a series of trainings addressing the 2005 Title 24 Energy Standards. In offering Title 24 trainings, which stress that as the Standards raise the bar for building energy performance, designers must move in the direction of integrated design if they hope to significantly exceed the minimum required for compliance and participate in financial incentive programs. The PEC will also offer trainings on the two software programs currently approved to demonstrate compliance with the Nonresidential Standards, EnergyPro and eQuest. In conjunction with the Energy Training Center, Stockton, the PEC will provide training on residential Title 24 compliance programs.

In addition to educational programs, the PEC provides access to design tools not easily available to architects and designers. The addition of the PEC's new overcast sky simulator offers an opportunity to increase our level of daylighting design assistance to architects. The device itself is a mirror-lined cube nine feet long in each dimension, topped by a bank of fluorescent lights. It is located on the second floor of the PEC. The overcast sky simulator is a test chamber that makes it possible to take numerical readings of illuminance and daylight factor in an appropriately built daylighting model. However, many architects are more comfortable trusting their eyes than a set of numbers. Perhaps even more powerfully, the overcast sky simulator makes it possible for architects to visually compare design alternatives, such as the location of clerestory windows or skylights, in a side by side setting. This increases the likelihood that the final design will meet key requirements for good daylighting, such as lack of glare.

Many architects have never built a daylighting model or used an overcast sky simulator. Because the tool is new we anticipate a need to market it and solicit upcoming daylighting projects via presentations in architecture offices. As awareness builds in the architectural community of the strengths of this design tool, demand for daylighting assistance should grow. To accommodate potential growth in demand, the PEC has had discussions with Professor Charles C. Benton of UC Berkeley's College of Environmental Design regarding involvement of paid student researchers in executing and documenting model tests in the overcast sky simulator.

By pairing the overcast sky simulator with the PEC's existing heliodon, architects have a rare opportunity to test a model under two conditions in one location. By using the heliodon to study direct sunlight and its control, and the overcast sky simulator to evaluate daylight distribution and relative brightness of interior surfaces, architects can

have much greater confidence in the success of their daylighting design in the finished building.

**The Tool Lending Library (TLL)**, because of its success (see 2003 Energy Centers Evaluation) over the last eleven years, has also had the effect of refocusing many efforts to the existing building community. Very specific educational “building performance” programs have encouraged the use of measurement as a way of both identifying potential energy savings and calculating, very concretely, dollar savings. Though always part of the engineering target market, the TLL has opened up a whole new world of building efficiency that did not exist prior to new, digital, measurement devices becoming available.

Because building operators can now use tools to measure actual equipment performance and calculate the savings through a variety of measures, PG&E is proposing that the TLL claim resource program savings that are not already covered when a customer participates in incentive programs. Based on the 2003 TLL EM&V study, these savings are substantial and show that information programs can be very effective in generating changes in both operation and equipment without a financial incentive.

To date, the TLL has been advertised only through the classes that have been held at the PEC and locations in Northern California describing the variety of tools and their uses in buildings. The PEC will target high value customers, managers of large commercial buildings and industrial/AG customer in all market sectors, with both advertising and measurement protocols that would permit calculating and reporting savings. This would approach will be especially important optimizing existing controls and doubly beneficial to both DSM and demand response efforts.

For example, the PEC may develop a specific package of tools and their applications that could be easily repeated across specific customer segments and building types. Specific examples include run-time of equipment, air-side economizers, and tuning occupancy sensors.

The Audits component can also generate referrals to the TLL where customers want a higher level of detail than the existing audit products can provide to customers. As well, mass market audit program customers who would like to have more specific measurement data would be referred back to the audit program implementers and the TLL.

The Tool Lending Library is in many ways a hidden gem of a program; hidden because it remains in relative obscurity within the Pacific Energy Center. A gem because it is an example of a well conceived and managed program that is providing demonstratable benefits to TLL users and PG&E and its customers.

**EVALUATION OF THE 2003  
STATEWIDE EDUCATION,  
TRAINING AND SERVICES  
PROGRAM**

**Food Service Technology Center (FSTC)**

The FSTC will continue to have implementation strategies that include:

- Development and adoption of new food service equipment test methods;
- Maintenance and recertification of existing food service equipment test methods;
- Equipment efficiency testing and associated reporting and maintenance of testing databases;
- Customer and industry education seminars;
- Design consultations;
- Maintenance and promotion of literature and education materials available through the FSTC Web site;
- On-site facility energy audits;
- Consultations and program guidance for other PG&E efficiency programs; and
- Advocacy and technical support for the development and adoption of codes and standards for commercial food service equipment.

PG&E and the FSTC program contractor (Fisher Nickel Inc.) will continue to rely on an Advisory Board consisting of manufacturer, customer, consulting firm, and regulator representatives to drive design and to leverage success.

The FSTC Advisory Board meets twice each year, reviewing the activities. Advisory Board members offer a real-world perspective on the food service market sector, and are particularly adept at suggesting ways of promulgating the energy efficiency message throughout a diverse and often fragmented industry.

FSTC staff members are also intimately attuned and involved in numerous manufacturer and food service market trade associations, ensuring that program activities meet industry needs, and have positive market effects.

Energy utilities in California and throughout the nation rely heavily on the twenty years of experience, confirming that the FSTC is a national leader in providing unbiased, objective information about energy efficiency in this market sector. These utilities use FSTC-developed information to guide their own energy efficiency offerings, and rely on the FSTC to provide the technological backing and market experience to support national standards for commercial kitchen equipment.

**Energy Training Center--Stockton**

The Energy Training Center – Stockton (ETC) is an integral, necessary and important part of the energy efficiency program portfolio. The ETC will work closely with all programs to coordinate and conduct seminars and workshops that complement the training and education needs of each the market segments. The ETC will continue to identify critical skills with low availability, and work with distributors, contractors,

builders, designers and city or county building department staffs to eliminate any skill gaps<sup>1</sup>. The ETC will provide educational services, on site/field training, technical assistance, and consultations

The ETC addresses the mass market sector by providing upstream and midstream education and training, services, and technical support grounded in its 25 years as a national leader in the field of energy efficiency. Major new initiatives to improve the quality of installation of HVAC systems will rely on extensive training support for building departments, energy raters, distributors and contractors. Serious gaps in knowledge, skill and ability exist that prevent contractors from properly installing and sealing ductwork, sizing systems according to industry standards, accurately charging systems with refrigerant, and providing adequate, proper airflow. National studies show that quality installation can improve actual operating efficiency by 35 percent. The ETC will focus on bridging those gaps with training programs in collaboration with the HVAC industry to capture savings that are not captured with equipment only programs. The ETC will also continue coordinating its program marketing, database content and calendar planning with PG&E's Pacific Energy Center (PEC).

The ETC will continue to operate the HVAC Diagnostic Tool Lending Library, an innovative program that allows contractors to borrow duct testing and combustion appliance safety equipment at no charge and helps in the implementation of a whole building performance approach to energy efficiency.

In order to make its training classes available to the greatest number of potential participants, the ETC will schedule its course offerings based on contractors' workloads. It is difficult for contractors to attend training sessions during the summer and winter months, so the majority of courses will be held in the spring and fall. Two course calendars will be published each year and will feature approximately 50 sessions on more than two dozen topics critical to the success of mass market energy saving incentive programs. For example, the Spring/Summer 2005 calendar covered courses in the following areas:

- Basics of Photovoltaic (PV) Systems for Residential Grid-Tied Applications
- Biggest Energy Mistakes Made in Residential Construction
- California Kitchen Downlighting System
- Compressorless Cooling
- Controlled Ventilation
- Energy Efficiency Sales Training
- "EnergyPro" Residential Building Energy Analysis
- The Georexchange Alternative
- High Performance Residential Windows
- House as a System
- House as a System Overview
- HVAC Quality Installation

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<sup>1</sup> For example, early in the availability cycle of high performance windows, proper installation was identified as a barrier to their achieving full potential. The ETC helped fill this gap with installation training for contractors.

HVAC System Air Flow and Static Pressure Diagnostics  
Hydronic Heating: What, When and How  
Insulate Right!  
Leadership in Energy & Environmental Design (LEED) – Residential Update  
“MICROPAS” Residential Energy Compliance  
Moisture Intrusion  
NATE Test Prep / Review  
Pool Filtration at Half the Cost  
Principles of Energy  
Proper Procedures for Charging Air Conditioners and Heat Pumps  
See the Heat!  
Tankless Water Heaters  
Title 24 – Advanced ACCA Manual D  
Title 24 - Duct Design (ACCA Manual D)  
Title 24 – Duct Installation Standards and Diagnostic Testing  
Title 24 - Equipment Sizing & Selection (ACCA Manual J)  
Title 24 HVAC System Change-Outs: Duct Testing Requirements for Residential and Non-Residential  
Title 24 In-Depth Review of the Energy Standards Compliance Documentation  
Title 24 Overview of the 2005 Residential Standards  
Title 24 Residential Lighting Credit  
Title 24 - Zoning Design (ACCA)  
The Truth About Motors, Fans & Pumps  
Water, Some Like It Hot

The ETC exists to increase the implementation of energy efficient measures and quality installation practices. Careful coordination with program managers, market actors and program advisors will take place in order to optimize the impact of the services offered.

Both the ETC and the PEC can serve as critical foci for the major initiatives anticipated expanding retro-commissioning throughout Northern California.

The services provided by the Education and Training program will supplement each of the other programs in the portfolio and assist customer, designers, contractors and engineers to make the choices that lead to energy efficient building.

### **Energy Audits for Business and Residential Customers**

Audit activities will be reviewed to incorporate approaches less generic and more specific to the customer. This can also link to specific available program options and increase the customer’s likelihood of taking specific energy savings actions. Audits for all types of customers need to be current with information provided in training activities (and the converse). These activities will also expand to include information on demand response and distributed generation as applicable to the specific customer or category of customers.

For example, PG&E has long offered audits and other actions to increase energy awareness and the concrete actions energy users can take to use energy wisely. Residential audits are offered in multiple languages and include special promotions to induce customers to raise efficiency of home improvements, retire their appliances, air conditioning systems or pool pump equipment. It will continue to do so in the future. But in the new market-based portfolio, this audit will be less of a stand-alone product and more effective if integrated into the portfolio. It can be an early step in the integrated intake process which moves customers through to affirmative energy efficiency choices, i.e., taking an action resulting in increased energy savings. Its form and messaging can reinforce other communications, making all stronger. The recommendations can be focused to particular customer needs in particular climate zones (as indicated by the value in the recently adopted energy efficiency avoided costs). Recommendations can be periodically adjusted to provide information about current or upcoming rebate opportunities. The technical information in residential audits should also be integrated with the technical information underlying other programs affecting this portion of the mass or residential new construction markets.

### **Energy Audits for Business Customers**

Audits are available to all nonresidential customers. Small and medium business customers will be offered a variety of audit options which will address all small business energy end uses. Audits for smaller customer will continue to support closely linked customer involvement in energy efficiency activity. We will focus on increasing the participation rate from the current 20-30 thirty percent of those audit customers who now participate in incentive programs and/or adopt energy efficiency measures recommended by auditors. In addition, there will be an emphasis on targeting certain areas and addressing seasonal energy usage fluctuations. Audit projects will be more closely linked to energy awareness activities.

PG&E will aggressively market audits, rebate and incentive programs to all types and sizes of businesses and particularly hard-to-reach customers. Businesses that have previously received energy audits, rebates or incentives usually benefit from a “continuous improvement” energy audit every one to three years. Marketing studies suggest that businesses usually require multiple solicitations before participating in an energy audit, rebate or incentive program.

PG&E will develop a policy and process for sharing the general and statistical audit results and recommendations with customers, trade allies and the community for energy project planning and prospecting. The following table summarizes the business audit portfolio:

Customer	Type of Audit					
	Mail-in	CD-ROM	On-line	Phone	On-site	Integrated
Very Small, <20 kW	•	•	•	•	•	
Small, 20-100 kW	•	•	•	•	•	
Medium, 100-200 kW	•	•	•	•	•	
Medium, 200-500 kW						•
Large, >500 kW						•

Small and medium-size businesses with less than 200 kW billing demand will be offered do-it-yourself online audits (English and Spanish versions), CD-ROM audits, mail-in audits, and interactive phone audits. PG&E projects performing 19,500 traditional energy audits for qualifying small and medium-size businesses during 2006-2008. These audits will provide recommendations and tips for energy conservation, energy efficiency, rebate/incentive information and links for qualifying measures. These audits may provide related sustainability information; e.g., energy benchmarking and demographics, water conservation, pollution prevention, and waste reduction and recycling.

PG&E will link the online audits to the “PG&E.com Customer Service Online Tool” for online bill payment and billing analysis.

PG&E is studying a new “wireless” energy audit tool with a PC Tablet or Personal Digital Assistant (PDA) with color printer for onsite production and discussion of the energy audit report with customers. PG&E anticipates 7,000 – 10,000 “wireless” audits for qualifying small and medium-size businesses during 2006-2008. The wireless audits will target smaller stand-alone stores, strip malls, shopping centers, restaurants, motels, convenience stores, grocery stores, office buildings and medical offices.

During the energy audit, the energy auditor will query the customer, survey the facility and equipment, identify the likely energy-savings opportunities, and input the pertinent design and operating data in the wireless audit tool. The wireless audit tool, developed and provided by qualified consultant, will improve the accuracy and effectiveness of the energy audit by incorporating the current and historical energy usage and cost data in the energy analysis. The wireless audit tool will produce:

- A clear and concise audit report with an executive summary;
- Energy balance;
- Detailed energy efficiency and demand response recommendations;
- Energy and energy cost savings estimates; and
- Rebate information for the qualifying measures.

Additionally, the wireless audit tool will transmit the audit results to the PG&E audit database for storage, reporting, and follow-up. Conventional checklist, laptop computer or PDA audits will substitute for wireless audits in areas without wireless capability.

PG&E is piloting the expansion of audit services to new market segments. The goal will be to create customer awareness and action by integrating energy efficiency, demand response and distributed generation. Recommendations will include maintenance and operations improvements, retro-commissioning opportunities, as well as conventional retrofit actions. These integrated audits may also include post-audit technical assistance to especially motivated customers. During 2006-2008, PG&E will continue conducting Integrated Energy Audits of commercial, industrial, institutional and agricultural facilities. PG&E account representatives will audit the 200 kW to <500 kW facilities with standard lighting and HVAC equipment and appliances. The improved Business Energy Survey Tool (BEST) integrated audit software will streamline the on-site audit process and improve the accuracy and effectiveness of the audit report and recommendations.

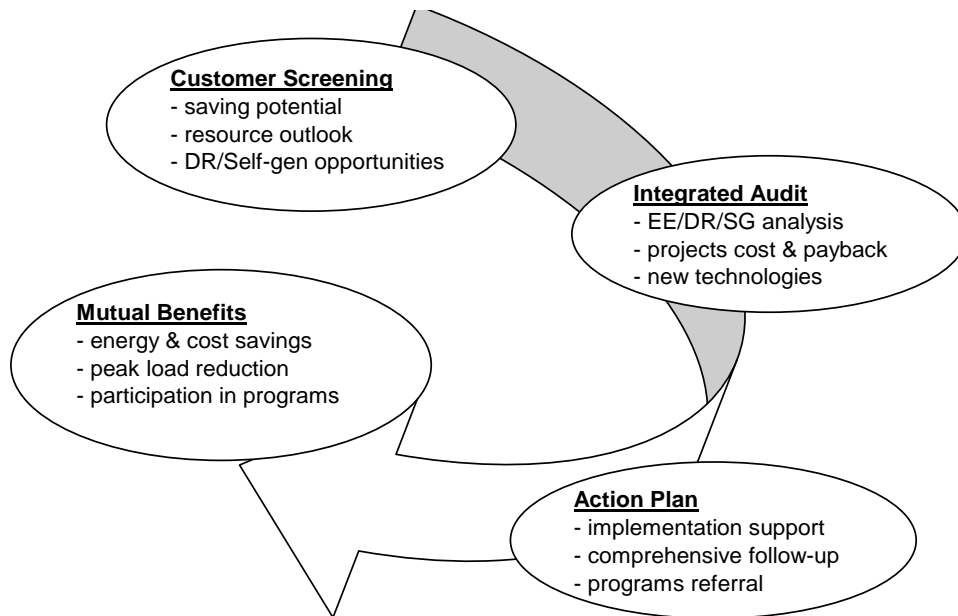
Engineering consultants will audit the 500 kW and larger facilities, complex facilities and the facilities with special needs. The improved audit screening process will match a qualified and experienced consultant to each qualifying facility with high energy and demand savings potential, and motivated management and staff with adequate resources for project implementation. In each case, the consultant will:

- Survey the processes, systems, equipment, buildings and support equipment;
- Identify and analyze the no & low-cost and investment opportunities in energy conservation, energy efficiency, demand response and self-generation;
- Develop an integrated audit report with an implementation plan for the recommended best practices and energy projects.

The integrated audit report will include project descriptions, specifications, diagrams, pictures, historical and interval energy data, energy monitoring data, energy calculations and modeling, charts, tables and graphs to explain the results, observations and recommendations. For each recommended measure, the integrated audit report will profile the estimated peak-period kW demand savings (and partial-peak kW demand savings and off-peak kW demand savings if these values differ), annual KWh savings, annual electricity cost savings, annual gas savings, annual gas cost savings, installed project cost, and simple payback period or return on investment. The consultant will discuss the integrated audit report with the customer (that may include trade allies and community partners). The consultant will assist the customer team in implementing the recommended measures and applying for the applicable PG&E or 3<sup>rd</sup> party programs, partnership and governmental incentives. Account representatives will periodically follow up with customers during decision-making and implementation phases to provide technical assistance for measures suggested by an audit report that can be

implemented with or without incentives. The savings achieved from installation of measures without financial assistance will be documented and claimed toward program goals.

The following diagram illustrates the process:



Special emphasis will be given to pre-screening and selecting, as well as follow-up with customers. PG&E's staff will conduct a cursory pre-audit site evaluation (on-site for large customers and via phone for medium size customers). Completed pre-screening surveys will identify detailed information about customer facility(s) in the following areas: customer motivation and major criteria, energy management practices, available resources, past experience in participation in utilities programs, as well as information about technical potential of retrofit, load management and demand response, and distributed generation projects.

The pre-screening survey will be given to the auditor for detailed survey and analysis. Audit reports will include energy and load balance; detailed information about customers' energy end uses and energy usage patterns, technical analysis for implementation of energy efficiency and demand response enabling technologies, best practices and measures for comprehensive load management, technical feasibility information about implementation of distributed generation technologies and potential, as well as traditional energy and demand saving suggestions, project implementation costs and pay back periods for energy efficiency measures.

Considerable attention will be given to providing customers with well-documented, detailed return-on-investment (ROI) calculations with an emphasis on high ROI measures in the report. By providing a full spectrum view of customer's business'

energy and cost savings, and presenting synergistic management options together as a package, the Integrated Audits allow for optimized project sequencing, multiple investment returns and building integrated energy strategies.

The Integrated Audit report will contain information about available incentives including Technical Incentive within Demand Response program; information about energy efficiency, demand response, distributed generation, partnership and third party programs, and market sector specific benchmarks. The auditor and/or account representative will present the report at customer site. This will start the follow up process that further continues with technical assistance in developing action and project implementation plans. The account managers will “sell” proposed programs and provide implementation assistance for measures that are implemented without incentives. The savings for these measures will be documented separately and claimed toward program goals.

### **Home Energy Efficiency Survey Program**

The HEES program plans to explore the option of integrating the real estate related time-of-sale strategies as part of its implementation plan. This program element will be offered to targeted customers, depending on which climate zone their homes are located in, and their annual energy usage. Other innovative opportunities will be explored in order to improve delivery and cost-effectiveness. Pilot projects will be introduced to test new theory and effectiveness at increasing mass market program activity to assist customers with extraordinarily high heating and cooling costs.

### **Energenius and Energy Patrol**

Energenius is PG&E’s K-8 student curriculum. Although Energenius is not expected to result in measurable energy reduction in schools, it will educate students, parents and school staff about the importance of energy efficiency and demand response to abating California’s energy problems. Energenius and Energy Patrol will be delivered upon request to K-8 schools throughout the PG&E service area.

Energenius and Energy Patrol also serve as excellent delivery mechanisms for some Mass Market offerings, low income program information, residential appliance incentives, internet and do-it-yourself home energy audits, CFL and holiday light promotions and Safe Kids (electricity and natural gas safety, and emergency response).

## **11. Customer Description**

Education and training efforts will affect all customers through those who access audits and those who indirectly benefit from the higher skill level of those contractors, vendors, and architects.

### **PEC**

Commercial building owners / operators  
Architects and engineers on New Construction side

**FSTC**

The Food Service Technology Center supports customers and clients in four primary market sectors: Educational facilities, Retail (including restaurants, food service, and supermarkets), Medical (including hospital and residential care facilities with food service operations), and Hospitality (including hotels). Commercial kitchen designers and food service equipment manufacturers are a key audience for FSTC services, as are energy efficiency program managers at PG&E and other California utilities, and regulatory agencies that establish energy efficiency standards for food service equipment (the California Energy Commission and the federal Environmental Protection Agency).

The following table delineates which services and functions of the FSTC strongly support customers in the four food service-related market sectors:

<b>Market Sector</b>	<b>Equipment Testing</b>	<b>Design Consultations</b>	<b>Site Surveys</b>	<b>Customer Education</b>
Education		X	X	X
Retail	X	X	X	X
Medical		X	X	X
Hospitality		X	X	X

**ETC**

Midstream and upstream mass market actors including contractors, builders, energy consultants, distributors, mechanical engineers, and building department inspectors and plan checkers.

Residential and Nonresidential Audits – See Section 10

12. Customer Interface

This program will interface directly with customers through energy audits and call center / Clearinghouse services. More often the training and educational activities will be focused on upstream vendors, contractors, and the design community.

13. Energy Measures and Program Activities

13.1 and 13.2

Energy measures and required data are provided in the cost-effectiveness calculator.

13.3. Non-energy Activities

13.3.1. End Use Load

All end uses targeted by other programs in the portfolio and supported by education and training efforts.

13.3.2. Targeted Sector

Sectors targeted by PG&E's entire portfolio

13.3.3. Activity Description

This program provides the energy audits, training sessions for customers, contractors, vendors, and the design community in support of the other programs in the portfolio. It includes the Tool Lending Libraries at the ETC and the PEC as well as consultations by energy experts and energy efficiency information.

13.3.4. Quantitative Activity Goals

**2006-2008 Education, Training and Outreach Activities**

<b>Program Activity</b>	<b>Pacific Energy Center</b>	<b>Energy Training Center, Stockton</b>	<b>Food Service Technology Center</b>	<b>Energy Audits for Business</b>	<b>Residential Energy Audits</b>	<b>SEL BCC</b>
Training Sessions	375	360	150			
Outreach Events	225	50	15			
Consultations	375	120	30			
Tool Loans	2500	90				
Audits			180	21,600	50,000	
Equipment Tests			55			

13.3.5. Assigned attributes of the activity

All market sectors and end uses in PG&E's portfolio

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.

Education and Training programs have historically augmented their market impact, course delivery capacity and subject matter capabilities by contracting with leaders in the industry. In fact, a substantial percentage of past implementation budgets have been outsourced. For instance, the ETC – Stockton utilized expert consultants for more than 75 percent of its course offerings in 2004-2005. Competitive bid processes are always utilized for substantial projects where multiple organizations are available to provide services.

The FSTC program is managed by PG&E and operated by a third-party contractor, Fisher Nickel Inc.

HEES outsources its mail delivered audit on a competitively bid process.

### 13.5. Quality Assurance and Evaluation Activities

The Education and Training program has quality assurance verification activities and evaluations 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. Independent consultants' impact and overarching evaluations and program tracking data will be used to ascertain the effectiveness of program intervention strategies in meeting defined customer energy efficiency educational needs and overcoming market barriers.

Evaluation will build upon the data gathered during the program interventions, i.e., course offerings, publications, outreach. Independent consultants will 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 program success at helping develop education and training around energy efficiency in the marketplace.

- **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 corrective guidance regarding program implementation through customer behavior and market actor studies, and 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 Education and Training program. The data used will be drawn from the process evaluation survey of customers and from the verification data collection. The market saturation/market share/potential data from statewide studies currently underway will be another primary source of information for market assessment and baseline analysis

- **Interim Impact Assessment and Feedback Analyses:** These tasks will provide ongoing feedback to program managers on the impacts being achieved. Focus will be on early identification of measures that are capturing energy savings and those that are not progressing; to enable timely program changes.

#### 13.6. Marketing Activities

The training centers will announce their classes and services through Web sites and targeted mailings to contractors, vendors, customers, and members of the design community. Other programs in the portfolio will recommend classes or services and support the activities of the centers.

The FSTC performs independent marketing activities for educational seminars, and PG&E account services representatives working with targeted market segments have been oriented regarding FSTC program offerings.

#### 14. Conclusion

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

#### 15. Appendices

The CALMAC Web site provides access to a number of recent studies of audits, and PG&E's centers.

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/).