
Pacific Gas and Electric PG&E Energy Center Profile #105

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Executive Summary

The Pacific Energy Center (PEC) is one of the leading energy centers in the United States, an impressive showcase of technologies and advanced techniques for electric and gas efficiency housed in an attractive 30,000 square foot center that has become a mecca for energy efficiency professionals in the Bay Area as well as an icon of PG&E's emphasis on customer services. Since the Center opened in late 1991, PEC has become world renowned for its technical capabilities and mission and thus is a potent model for subsequent initiatives.

Located in downtown San Francisco, PEC has been specifically targeted on the design community. In fact, the focus has been even narrower, improving the efficiency of new commercial construction and office spaces. Over time, however, this orientation has been refashioned as PG&E staff realize the tremendous opportunities that exist by working with building owners and facility managers who can expeditiously implement efficiency improvements in existing facilities, providing short-term results while the Center continues its emphasis on avoiding lost opportunities. The Center does include a residential center and rather impressive interactive display in the lobby, though this is not PEC's main focus. Staff comment, however, that a surprising number of professionals that visit PEC end up taking home literature from the residential display, supporting the notion that energy efficiency begins at home.

PEC staff have forthrightly addressed the challenge of justifying the Center's cost. So far, PEC has cost PG&E's ratepayers \$14 million. The impact of energy centers is inherently difficult to quantify, while large expenditures are subject to intense scrutiny. PEC has carefully documented the more than 30,000 visitors it has hosted, while evaluating the Center using the perspectives of utility representatives and visitors. This intense self-examination has been helpful for PEC to continue to refine its focus to provide maximum benefit for PG&E customers, especially in this time of greater utility competition.

In the future, PEC and other energy centers will be further adapted to competition. Rather than fostering energy efficiency in particular, they will likely encourage the wise use of their principle product and may encompass a wider variety of services including power quality management and environmental compliance. Energy centers may even charge for the use of their facilities and technical services, or allow financing the cost of their services on utility bills, another means of establishing a firm handshake with customers. Thus energy centers can play an important role in a utility's overall marketing and corporate strategy, a theme that is embedded throughout this Profile.

PACIFIC GAS AND ELECTRIC PG&E Energy Center

Sector: Office buildings (some residential)

History: PEC opened in December 1991 to serve the Bay Area's 100,000 design professionals and PG&E's 5 million customers with demonstrations, extensive energy information, tool lending, and technical services

Facility: PEC located in downtown San Francisco in a 30,000 "intensely remodelled" older building; houses conference center, lighting and HVAC classrooms, commercial building performance center, daylighting lab, residential center, extensive energy resource library

Visitors: In 1994, for example, visitors participated in 114 technical presentations, 40 technical seminars, 105 custom technical presentations, 141 project consultations, 1,183 research consultations, and 156 tool lending library service transactions

CUMULATIVE PROGRAM DATA

Visitors: 30,890

Cost: \$14.0 million

CONVENTIONS

For the entire 1994 profile series all dollar values have been adjusted to 1990 U.S. dollar levels unless otherwise specified. Inflation and exchange rates were derived from the U.S. Department of Labor's Consumer Price Index and the U.S. Federal Reserve's foreign exchange rates.

The Results Center uses three conventions for presenting program savings. **ANNUAL SAVINGS** refer to the annualized value of increments of energy and capacity installed in a given year, or what might be best described as the first full-year effect of the measures installed in a given year. **CUMULATIVE SAVINGS** represent the savings in a given year for all measures installed to date. **LIFECYCLE SAVINGS** are calculated by multiplying the annual savings by the assumed average measure lifetime. **CAUTION:** cumulative and lifecycle savings are theoretical values that usually represent only the technical measure lifetimes and are not adjusted for attrition unless specifically stated.

Utility Overview

Pacific Gas & Electric (PG&E) is the nation's largest gas and electric investor-owned utility and served more than 13 million people in 1994. While PG&E's headquarters are located in San Francisco, its 94,000 square mile service territory in Northern and Central California is broken down into 18 divisions to provide service to 4.36 million electric customers and 3.53 million gas customers. With total assets approaching \$28 billion, electricity sales represented approximately three-quarters of the company's total operating revenues which totalled over ten billion dollars. Electricity sales totaled 75,621 GWh in 1994 (a 0% change from 1993) and provided the company with just over \$8 billion in revenues.[R#1,2,25]

In 1993 residential customers accounted for 32.2% of sales, the commercial sector accounted for 34.5% of sales, and the industrial sector accounted for 21.2% of sales. The remaining 12.1% of sales were to other types of customers, mainly agricultural accounts. In 1993 PG&E had 3,800,399 residential electric customers, 452,819 commercial customers, 1,243 industrial customers, 89,353 agricultural customers, and 16,865 miscellaneous customers.[R#2]

Like many utilities in North America, PG&E has responded quickly to increased competitive forces as well as the economic recession in California that has slowed growth in electricity use. It dramatically cut staff in the past few years. In fact between 1992 and 1993, 3,600 staff were cut, representing 13.5% of the 1992 workforce and resulting in 23,000 employees in 1993. An additional number of workers cut will bring the total to approximately 6,000 positions by the end of 1995. PG&E claims that its reorganization has already resulted in annual savings of \$200 million and will enable the utility a greater degree of flexibility to respond to changes in the industry, with fewer layers of management standing to impede the utility's responses to market challenges. Furthermore, PG&E hopes that its restructuring will promote productivity, by encouraging innovation and better utilizing employees' experience. This will be critical in the years to come as the giant utility works to enhance customer services to retain major customers and maintain shareholder profitability.[R#1,2]

PG&E 1994 ELECTRIC STATISTICS

<i>Number of Customers</i>	<i>4,360,679</i>
<i>Number of Employees</i>	<i>21,000</i>
<i>Energy Sales</i>	<i>75,621 GWh</i>
<i>Energy Sales Revenues</i>	<i>\$8.028 billion</i>
<i>Summer Peak Demand</i>	<i>15,334 MW</i>
<i>Generating Capacity</i>	<i>18,768 MW</i>
<i>Reserve Margin</i>	<i>22.4%</i>
<u>Average Electric Rates</u>	
<i>Residential</i>	<i>12.25 ¢/kWh</i>
<i>Commercial</i>	<i>11.04 ¢/kWh</i>
<i>Industrial</i>	<i>7.05 ¢/kWh</i>
<i>Agricultural</i>	<i>10.78 ¢/kWh</i>

One of PG&E's subsidiaries, PG&E Enterprises, has been busy building and operating unregulated power plants on the East Coast that supply wholesale power to other utilities. U.S. Generating Company, a joint venture with Bechtel Group, Inc. and PG&E, has about a dozen power plants in operation or construction in Florida, New Jersey, Pennsylvania, Massachusetts, and New York that represent more than 1,700 MW of capacity. PG&E is also considering whether to enter the international marketplace with its power plant construction capabilities.

The City of San Francisco, where PG&E's headquarters are located, has a population of 724,000, but the metropolitan "Bay area" is much larger. The local economy is based on computer, electronics, and technological industries, as well as manufacturing. The City has an annual average temperature of 56.6° F and has average annual precipitation of 19.71 inches. Typically San Francisco has 3,161 heating degree days and 115 cooling degree days. PG&E's service territory, however, is highly diverse, ranging from snow-packed, mountainous areas to scorching desert, providing the utility with a host of challenges in its delivery of reliable power services.

Utility DSM Overview

Pacific Gas & Electric has been among the leading U.S. utilities in the field of demand-side management (DSM) since 1976. Over the years the utility has spent more than \$2.5 billion on its conservation and load management activities, including a small sum for solar DSM activities. The data presented in this section refers only to conservation and load management and represents both gas and electric expenditures and savings.[R#26]

PG&E refers to its conservation efforts as Conservation/Energy Efficiency (CEE) programs. These programs were significantly expanded in 1990 when the California Public Utilities Commission issued a decision authorizing the utility to implement new energy efficiency programs and enhance existing ones.[R#26]

PG&E 1994 DSM PROGRAMS

Residential

Appliance Efficiency Incentives

Direct Assistance

Energy Management Services

Information Programs

New Construction

Weatherization Retrofit Programs

Nonresidential

Agricultural EE Incentives

Agricultural EM Services

Commercial EE Incentives

Commercial EM Services

Industrial EE Incentives

Industrial EM Services

Information Services

PG&E Energy Center

New Construction

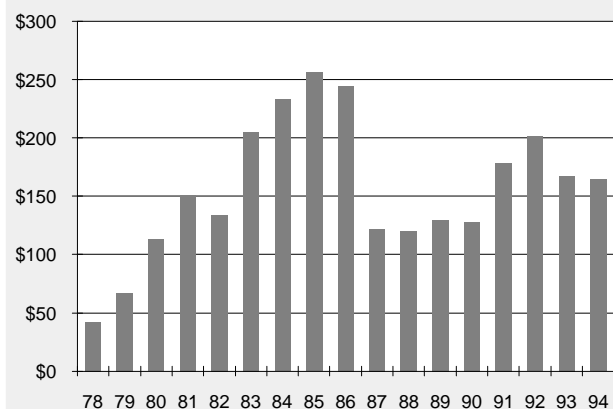
Thermal Energy Storage

In 1994, DSM program expenditures were equal to 2% of the utility's total electric revenues. DSM expenditures for 1994 totaled \$160 million while annual energy savings were 670 GWh, peak capacity savings totaled 131 MW, and gas savings reached 13 million therms. Electricity savings were higher than expected for the nonresidential programs in 1994. This was a result of PG&E's decision to close its Nonresidential Customized program at the end of 1994, which prompted excess applications from last-minute customers.

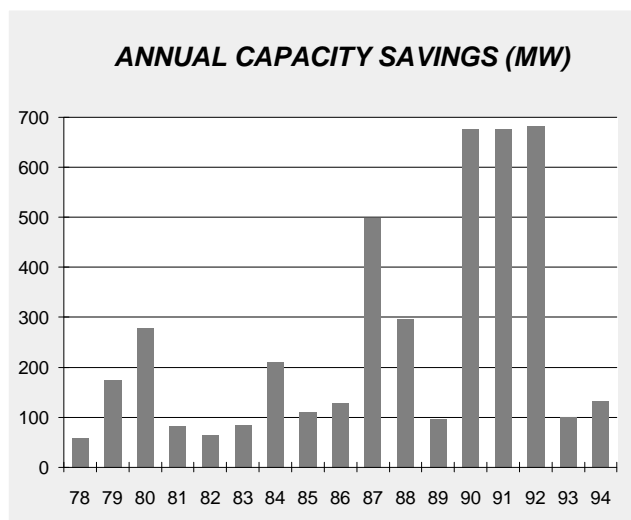
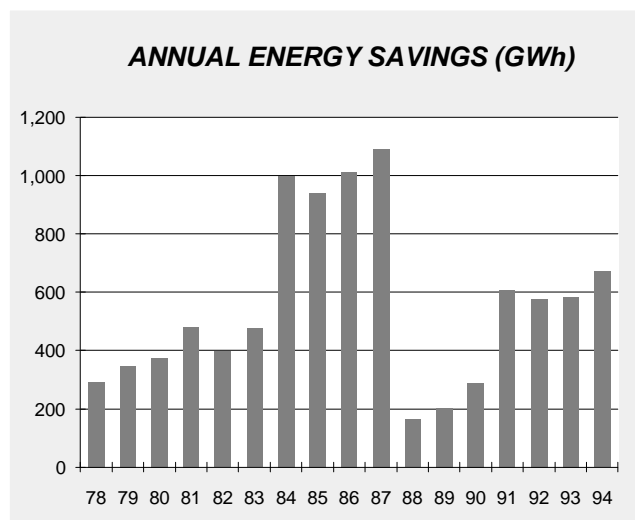
PG&E's 1995 DSM budget has been scaled back slightly, to \$150 million, with savings goals dropped to 363 GWh and a capacity savings of 74 MW for electricity, and 10.4 million therms for gas. This budget reflects the redesigning of the Residential programs which involves the elimination, reduction, and modification of some of these programs. A shift occurred in the Nonresidential programs as well. A greater variety of incentives will be offered in 1995, including third-party financing and engineering studies.

Included in PG&E's efforts to streamline its budget is the PG&E Energy Center, the subject of this Profile. The Center provides customers with a technical resource for information regarding all energy-using systems, with services ranging from Customized Technical Presentations to a Tool Lending Library. In the present year, PG&E is continuing with the Center's core services, with increased attention on new technologies, better design, and improved building comfort levels for added value.

ANNUAL DSM EXPENDITURE (\$1,000)



DSM OVERVIEW	ANNUAL C&LM EXPENDITURE (x1,000)	ANNUAL ENERGY SAVINGS (GWh)	ANNUAL CAPACITY SAVINGS (MW)	ANNUAL GAS SAVINGS (MILLION THERMS)
1976	\$21,413	246	64	47
1977	\$25,737	249	48	67
1978	\$42,245	292	59	50
1979	\$67,246	347	175	76
1980	\$113,082	375	277	66
1981	\$151,093	479	81	87
1982	\$133,601	396	63	99
1983	\$204,913	476	84	75
1984	\$232,788	997	211	59
1985	\$256,044	941	110	119
1986	\$244,701	1,010	129	140
1987	\$121,931	1,091	498	48
1988	\$119,708	163	296	12
1989	\$129,593	202	97	14
1990	\$128,292	288	676	25
1991	\$178,767	607	676	32
1992	\$201,248	577	682	29
1993	\$167,259	584	101	16
1994	\$164,057	670	131	13
Total	\$2,703,717	9,990	4,458	1,074



Program Design and Delivery

Pacific Gas & Electric had a clear vision for its Energy Center: "The PG&E Energy Center is a corporate investment in the competitiveness of our customers. As a cost-effective channel for communicating about the services our customer's value, the Energy Center is a tool for attracting and retaining customers." At the heart of PG&E's vision is a philosophy that the utility can only be as financially as strong and viable as its customers. Thus, while energy efficiency is only one aspect of doing business, it is a clear means for PG&E to work with its customers, to improve their bottom lines, and to thus increase their competitiveness.[R#12]

The PG&E Energy Center (herein called "PEC" or "the Center") bridges the implementation gap between advanced technologies and down-to-earth applications. As an information transfer center, PG&E provides energy application solutions to meet its customers' business challenges. PEC staff take pride in the fact that the Center is, "a flexible communications vehicle where customers can learn how to profitably use PG&E's services in an increasingly competitive marketplace." [R#12]

Closely tied with this orientation regarding the competitive marketplace, the Center has recently gone through an interesting evolution. It has refashioned its services in line with the increasingly competitive utility environment. This has involved a significant degree of cost cutting and a basic reorientation with its mission. Rather than opening its doors as wide as it has in the past and aggressively promoting PG&E's rebates for implementation of energy-saving technologies, PG&E recognizes that it has developed an invaluable resource that it must now use for the explicit benefit of its customers. As such, the company realizes that extending the Energy Center's services to interested groups outside its service territory no longer makes sense.

When PEC was built five years ago, PG&E's demand-side management activities primarily addressed new construction and avoiding lost opportunities. The focus of the PG&E Energy Center has evolved over time but was originally directed towards the design community and within this universe, to focus on office spaces. Nearly all of PG&E's commercial accounts have offices of some kind, a common need in San Francisco. Furthermore, there are 100,000 design professionals

in the Bay area (in addition to a concentration of five million PG&E customers). Given their disproportionate influence on energy consumption, PG&E sought to educate this community about the potentials for energy efficiency.

Influencing the design community, however, has been the greatest challenge that PEC has faced and requires special attention to timing. Energy efficiency recommendations made too soon are forgotten; recommendations made too late cause costly change orders at best or simply cannot be incorporated in ultimate building designs. Tom Patterson, who was the Center's acting team leader for a number of months in 1994, reported that PEC staff must have a critical sensitivity to design and building process. Furthermore, the decision makers must be identified and influenced. Typically, senior architects make the big decisions such as orientation and what new buildings will actually look like, then their junior staff handle the specifications for all the mechanicals which also dramatically influence energy use. Thus when and how to intervene requires careful timing and heightened sensitivity.

To make the challenge even more difficult, energy efficiency in and of itself is not of particular interest to the design community. Thus in order to market the Center, PEC staff have had to focus on the results of more efficient designs. These results, such as better comfort and ultimately increased worker productivity, get architects' attention. PEC staff have found that architects are more concerned with the comfort of their buildings. Owners realize that comfort is a big issue surrounding tenant retention and resale value. In fact, a Building Owners and Managers Association study, "Office Tenants Moves and Changes," on why tenants leave buildings found that temperature is the single worst building performance issue and that 30% of departures were due to thermal discomfort. Thus if PEC could address workers' thermal comfort and ultimately productivity, perhaps the Center's leverage would meet expectations.[R#24]

Currently, the PG&E Energy Center serves multiple purposes. Not only does PEC fulfill a profound customer service that is intended to enhance customer relations and thereby maintain load, but it also is intended to avoid lost opportunities in new commercial design and renovation and to stimulate market

transformations whereby more efficient products become the norm in the marketplace. To serve these needs, currently PEC provides a wide range of resources including early energy reviews, design assistance, design tool and information resources, technical education, commercial technology exhibits, and mock-ups.[R#3]

PG&E had considered building an energy center for several years prior to the establishment and grand opening of PEC in December of 1991. In 1986, Seattle City Light and other Northwestern utilities along with the Natural Resources Defense Council were getting the Lighting Design Laboratory established, and this process was watched carefully by PG&E. (See Profile #27) Although the notion was attractive to PG&E, during the 1986-1987 period PG&E was backing away from customer incentives for efficiency programs for a number of reasons.

In 1989, thanks to the renewed interest in demand-side management in California that came out of the California Collaborative, the notion of an energy center was rekindled at PG&E. The utility wanted to expand LDL's concept to include a greater focus on building systems. The design process for the Center was supported by both the Lawrence Berkeley Laboratory's Building Systems Division, a premier research facility located on the campus of the University of California at Berkeley which maintains an active role with the Center to date, and to an even greater extent by the Building Sciences Group at the University of California. The Center was also complemented by the Advanced Customer Technology Test (ACT2) which began shortly after PEC opened its doors. ACT2 supported PEC with demonstrations of the technologies on display at PEC and by testing the gross technical potential of the systematic use of energy-efficient technologies.[R#18]

In 1990 PG&E made a commitment to establish what it then called the Pacific Energy Center. Michelle Silva was brought in to manage the Center and Jim Chace, one of its earliest proponents, became its Technical Director. Construction took place in 1991 and the Center opened in December 1991. The facility itself is a 30,000 square foot, "intensively remodeled" older building located at 851 Howard Street, San Francisco, just a block away from the Moscone Convention Center and two

blocks off Market Street in downtown San Francisco.

The PG&E Energy Center is housed in a post industrial building which PG&E completely gutted and renovated to become a showcase of energy-efficient products, and to be used as a center for the exchange and dissemination on technologies and techniques for energy efficiency. Fundamentally, PEC is a flexible, interactive environment designed to be used in many ways and to provide vivid commercial and residential sector demonstrations, supported with technical services, exhibit services, and comprehensive information services through the a well-stocked library called the Energy Resource Center.

Complementing the range of technical and information services PEC provides are its complete meeting facilities. The Center is equipped to handle all sorts of meetings, from one-on-one customer meetings to regional ASHRAE meetings to high profile meetings such as a meeting between PG&E's Chairman, Richard Clarke and U.S. Assistant Secretary of Energy Christine Ervin. Thus, in addition to extensive exhibits, the Center houses a conference center and three classrooms complete with catering services for luncheons, dinner meetings, and other receptions.

CONFERENCE CENTER

The Conference Center accommodates up to 100 people and this enables professional engineering and design groups and associations to sponsor seminars and workshops at PEC, all building on the Center's effect. The conference center is fully equipped with audio/visual capabilities and a large rolling wall that may be opened for receptions and trade shows.

THE LIGHTING CLASSROOM/DEMONSTRATION LAB

The Lighting Classroom/Demonstration Lab features demonstrations of key concepts in lighting and perception theory and practice, including vignettes allowing side-by-side comparisons of fixtures and lighting systems. A Lighting Mockup Lab upstairs complements the classroom and consists of two bays with adjustable ceilings and changeable glazing. Architects, designers, and engineers can mock-up actual room designs for side-by-side comparisons of lighting designs and fixtures.

Program Design and Delivery (continued)

THE HVAC CLASSROOM/DEMONSTRATION LAB

The HVAC Classroom/Demonstration Lab allows up to 35 people at a time to study heating, ventilating, and air conditioning equipments and systems.

THE DAYLIGHTING LAB

The Daylighting Lab lets architects and lighting professionals simulate the effect of daylight on a variety of spaces. The Daylighting Model Shop lets them build and test prototypes for their clients' projects. These facilities allow PG&E's representatives and their customers means to foster explorations of ways to balance lighting needs between natural and artificial sources and to carefully address potential glare problems.[R#3]

THE HELIODON STATION

The Heliodon Station combines an adjustable table, representing the earth, with a ceiling-mounted light source, representing the sun, to simulate the effect of sunlight on a building at any time of day or year. Existing architectural models or those constructed for testing purposes in the Daylighting Model Shop can be used. A service provided by PEC staff is Solar Data analysis, whereby PEC staff can take information from the heliodon session and import it into a spreadsheet calculation that quickly generates solar radiation data. To fully support design professionals, PEC staff document all data collected through the process and present it in a report, complete with images from the session, to the customer.[R#3]

COMMERCIAL DESIGN SERVICES

The upstairs of PEC is devoted to the commercial services as well as administrative offices. The commercial services include an advanced products gallery complete with self-guided exhibits, the heliodon station, and the newly constructed Building Performance Center.

When one comes upstairs at the Center one enters the Advanced Products Gallery. This gallery, lit with skylights, houses temporary exhibits of energy-efficient products and equipment and its T8 fluorescent, electronically ballasted fixtures are controlled by daylight sensors.

PEC staff point out that commercial office occupant satisfaction, and thus value to building owners, doesn't happen by accident. High performance buildings are a function of knowledgeable designers. This is where PEC offers assistance for both new and retrofit applications. The staff understands that occupants in a comfortable environment have a greater sense of well being. Workers are more productive, students more attentive, shoppers spend more freely, and hospital patients recover more quickly. Beyond that, high performance buildings make good sense, with lower operating costs, stable tenancy, and high market value.[R#9]

One of the fundamental orientations of the PEC Technical Staff, headed by Jim Chace, is that capturing optimal levels of energy efficiency requires a systems approach. Various disciplines and decisions overlap. Technical staff thus work with customers to help them explore a range of efficiency opportunities, including daylighting strategies, proper lighting, and HVAC improvements, and then to develop a commissioning plan to assure maximum savings and the proper working order of sometimes rather complex systems.

BUILDING PERFORMANCE CENTER

Without question the feature attraction of PEC's Commercial Design Services is the Building Performance Center. Since January 1994, visitors have been exposed to a PEC's new and most important focus: building performance. This exhibit features a side-by-side comparison of two buildings' office spaces, with each identical space accounting for about 500 square feet. One full-scale space was designed to fulfill the minimum code requirements of California's well-known Title 24 building standards. On the other side of the room is an identical office mock-up designed for maximum comfort and efficiency using state-of-the-art technologies while still conforming with Illuminating Engineering Society (IES) lighting guidelines for contrast ratios and lighting levels. New exhibits highlight opportunities in lighting, HVAC, and envelope improvements to move buildings beyond code minima.[R#9]

The centerpiece of the Building Performance Center exhibit is a \$140,000 lighting display. A large, electronic, centrally-located scoreboard, called the "Power and Energy Use Display," provides visitors with instantaneous readings of wattage required for four basic end-use categories: task lights, general

lights, computers, and plug load. At a kiosk in the center of the exhibit, visitors can select and then witness five different lighting scenarios which in each case compare “code compliant systems” and “optimized systems”: 1. direct lighting, 2. direct lighting with task lighting, 3. indirect lighting 4. indirect lighting with task lighting, 5. task lighting only. Dozens of foot-candle meters are set on desks for the benefit of visitors so that they can compare direct and indirect lighting with or without task lighting. For example, the meters make it obvious for visitors to see that task lights increase the lighting on the workplace from an ambient level of 30 footcandles to 60-70 footcandles.

In addition to raising awareness of state-of-the-art lighting technologies, and configurations to best suit the needs of the workers in a particular space, several other lessons are taught at the exhibit. For instance, computer plug loads are examined. While each side of the room has an identical number of computers and printers (one IBM clone and one Apple on each side), the state-of-the-art configuration features Energy Star computers and a bubble jet fax and printer.

Meters that are close to the simulated windows measure the temperature of the interior surface of the window using a temperature probe. Standard code-compliant windows can reach interior surface temperatures of up to 120°F, causing workers to feel like they're sitting next to an oven. (Furthermore, the windows tend to be oversized for design reasons, adding to the problem.) The “superwindows” in the optimized office space, however, allow only visible light while reflecting heat radiation away. Furthermore, the code-compliant side of the room also requires a fan to remove external heat gain in the summer, and a space heater at foot level to provide much-needed heat in the winter. These appliances add dramatically to plug load as witnesses can so easily see at the exhibit.

Several other things are demonstrated like dark fabrics in cubicles, which make efficiency offices feel unnecessarily small. The glazings exhibit shows visitors the importance of appropriately sized windows through the use of artificial suns and meters produced by the Southwall Company which measure both the light and heat transmittance of various window glazings. Staff stress the importance of “asymmetric radiation” and how it plays havoc with worker comfort and thus productivity. Like sitting next to a campfire on a cold evening, with the

front of your body toasty and your back freezing, buildings and especially their glazings pose a problem with external heat gain in buildings. How to increase comfort and eradicate discomfort is a key aspect of the work that the PEC staff provide for PG&E's customers.

THE RESIDENTIAL CENTER

While the clear intent of PEC is to focus on the design community, PG&E also realized that it must provide some form of outreach and educational awareness for its residential customers. (This was not only an opportunity, but an obligation given the cost and value of the Center for all customers.) By the end of the century PG&E expects that its residential base will increase by 2.5 million households, yet another opportunity to embed energy efficiency in design and construction saving significant amounts of energy in years to come.

After the 1992 Oakland fire, the Energy Center built a high efficiency demonstration home in its second floor warehouse since there was an instant need for 3,000 new homes in its service territory. The home demonstrated efficient design practices, including proper duct placement and duct sealing practices. By using a rebate program to provide incentives to builders to install and test ducts in accordance with PG&E's requirements, the need for upgrades or replacements is eliminated. (See Profile #51: Duct Testing and Repair Programs) The home was subsequently moved out to PG&E's Stockton training facility. [R#10,20]

Currently residential customers benefit from the “Challenge 2000 house,” a structurally appealing first-floor display where visitors learn practical ways to meet the energy challenges of the future in a lively interactive exhibit and fast-paced computer game called “Power Play.” (Challenge 2000 is not actually a home but instead a series of displays designed specifically to engage visitors to the Center in its lobby.) A Super Efficient Refrigerator Program (SERP) refrigerator is prominently on display with signs explaining its features. (See Profile #106) Also on display is an infrared camera and television monitor pointed at the visitor to vividly show bodies' heat loss with signs explaining how this relates to homes' heat loss. There is also a powerful exhibit made up of rows of incandescent lightbulbs intended to show the electrical intensity of hair drying. ☞

Program Design and Delivery (continued)

TECHNICAL SERVICES

In addition to the displays at PEC and the plethora of interest group meetings that take place there, PEC is also staffed by a very sophisticated technical team headed up by Jim Chace. This staff complements the demonstrations at PEC and provide in-depth, value-added services for PG&E's customers. As Jim Chace explains it, the Technical Services staff is trained to work for the customers, finding creative and practical solutions to their problems, helping them use energy as wisely as possible. Chace continues that sometimes this may not result in energy savings as his staff's recommendations maintain a paramount focus on customer satisfaction whether this means increasing or decreasing energy use. For instance, staff would never recommend compact fluorescent lamps for diamond cutters and assessors, for the lamps' incomplete spectra of light would not suffice in this application. Instead, staff would recommend halogens, a more efficient option than incandescents that will suit the particular needs of this client type. In this case, more lighting may help the customer do his job better.[R#5]

In addition to providing detailed consultations with customers and marketing representatives, the Technical Services group has developed an impressive roster of technical fact sheets. These 2-4 page fact sheets cover a wide range of technologies which serve as primers for customers on more common opportunities for efficiency. To a lesser extent they cover policy issues such as the import of the Federal 1992 Energy Policy Act to local businesses. Each fact sheet provides readers with sources for additional information. These sheets were developed in-house, often drawing liberally from EPRI publications. Naturally customers that desire more information can then access the Center's extensive library.

PEC has also conducted in-house analyses and experiments for its customers with technologies such as advanced lighting, air conditioning, glazing, and control system technologies. This hands-on orientation has been a pillar of the center's success to date.

INFORMATION SERVICES: THE ENERGY RESOURCE CENTER

Part of the PEC vision was to establish an "information transfer center" for the company's customers. This has certainly been accomplished in several ways and greatly supported by the

library housed at PEC. The Energy Resource Center (ERC) has been staffed by two full-time librarians who are on hand to assist visitors in obtaining up-to-the-minute technical information about energy-efficient products and design techniques for residential and commercial buildings. Currently there is one librarian at the Center.

The Energy Resource Center is located on the lower level of the PG&E Energy Center. It is a well-stocked library serving building and design professionals with a non-circulating collection. The library has more than 500 titles related to building construction, design, and performance as well as energy-efficient technologies and applications. Materials include books, journals, manufacturers' catalogs, videotapes, reports, and other special publications.

New features at the ERC include CD-ROM subscriptions, a CD ROM workstation for Center visitors, and an on-line public access of ERC titles. The current CD-ROM collection includes: NTIS, National Technical Information Service; ICONDA, International Construction Database; ETDE, Energy Technology Data Exchange; Business Periodicals Abstract (which covers more than 300 business journals); and ASHRAE Transtext which provides citations to more than 4,000 ASHRAE publications and the full text of selected volumes.[R#9]

As with all the services provided at PEC, ERC is available both the utility's customers and its staff. ERC staff encourage marketing representatives (reps) to use its capabilities. Reps (and customers) can simply phone in, seek technical information, and have quick and convenient access to on-line services "jockeyed" by an experienced librarian. Naturally providing quick responses has been a key to the ERC's success. Furthermore, there is a powerful synergy with Technical Services: Issues that cannot be fully addressed by the librarians can easily be transferred to Technical Services for further investigation and consultation.

Visitors to the Building Performance Center can follow up on their tour with a stop at the library where they can access relevant materials such as the ASHRAE Handbook Fundamentals, the California Energy Commission's energy-efficiency standards for residential and non-residential buildings (Title 24), Energy Design Handbook, and the IES Lighting Handbook.

ERC also provides a host of on-line services that are easy to use and which allow customers in their own offices to browse through all the collections at the Center. Using key word searches, once a specific topic is identified, users can easily navigate to other titles on the same subject or by the same author or publisher and then visit the Center to follow-up on specific titles of interest.[R#9]

The ERC also houses computer design software and hardware which are available for demonstration and individual use by appointment. PEC has a software specialist on staff who is accessible to customers to view PEC's wide array of building analysis software.

The ERC also houses an extensive collection of videotapes covering case studies, product literature, and design tips. Tapes can be viewed anytime the ERC is open or, for example, at Brown Bag lunches which highlight a particular video, such as one on London's Stansted Airport designed by the architectural team Foster/Arup, the same team that also designed the Bank of Hong Kong and Shanghai.[R#9]

EXHIBIT SERVICES

Exhibit Services, a function that has now been eliminated by PG&E, was located in Oakland rather than being housed within PEC, but was an integral part of PG&E's orientation. Through demonstrations of energy efficiency and eye-catching exhibits, customer awareness levels can be raised. In a memo from the former PEC Director to marketing reps encouraging them to find out how to fully utilize the center, Judith Olney claimed, "Exhibit Services gives dimension and presence to your promotional concepts. Our one-stop in-house consulting and creative service is available to all [PG&E] departments system-wide." Exhibit Services was essentially an extension of the Center's outreach, a means to present energy efficiency through advanced graphics and other exhibit media.[R#20]

Exhibit Services worked under PEC but for PEC as well as other PG&E departments. It also had a "lending library" of past exhibits that were available to be used or reconfigured. Exhibit Services provided consultation and design, exhibit production (complete with a cabinet-making shop, plastic fabrication capabilities, computer graphics, laminating, mounting), and exhibit installation.[R#20]

Recent projects completed by Exhibit Services in addition to the exhibit and graphic support provided to PEC, include an EV exhibit at the Lafayette BART station and an exhibit at the Diablo Canyon Biological Monitoring Lab. Exhibit Services also built exhibits for trade shows.[R#20]

TOOL LENDING SERVICES

Following the theme of providing tools for customers, PEC houses a tool lending library. There customers as well as marketing staff can check out energy analysis tools from simple meters to expensive infrared cameras. The justification of the library is simple: To ensure efficiency and comfort operation in buildings their operators need accurate information about system operation both during commissioning and afterwards. Good measurement tools provide this information.

PG&E's tool lending library offers a wide range of performance measurement devices including data loggers and hand-held survey instruments capable of measuring everything from dry bulb temperatures to power consumption. Pocket loggers, for example, are small tools that can measure a wide range of building operating variables, such as temperature, electric current, light level, humidity, and pressure. Applications of this service include troubleshooting excessive energy consumption to determine retrofit opportunities, verifying estimated savings calculations, and quantifying retrofit savings. Customers are encouraged to call a special line at the Energy Center to obtain a catalog of available tools. (PG&E considers its inventory of tools to be proprietary.)

The lending library also provides comprehensive application instructions to facilitate the use of the tools. PG&E Energy Center staff have researched and identified tools and techniques that offer the greatest return for effective monitoring. Literature describes the individual tools, their analysis protocols, and software targeted at specific applications. In fact to further the value of this service, staff have developed "toolkits" for customers unfamiliar with the devices available to them. These toolkits are essentially packages of measuring tools designed for ease of use. The introductory toolkits provide a means for both customers and marketing representatives to get acquainted with data collection techniques and hardware. Applying data collection and analysis leads to a better understanding of building performance, which in turn leads to more efficient operation and a more comfortable environment.

Program Design and Delivery (continued)

Within its first five months of operation, the tool lending library identified 820 kW in demand savings and 1,658,200 kWh in energy savings.[R#9,13,23]

MARKETING AND DELIVERY

One of the fundamental and interesting aspects of utilizing the Center is that it serves two distinct purposes and audiences: utility customers and utility staff. PEC defines these visitor types as “external” and “internal” to the company.

EXTERNAL MARKETING: TO UTILITY CUSTOMERS

At first PEC was focused on architects and the design community. Over time, however, there has been an expansion of this focus to encompass building operators and facility managers, broadening PEC’s application to cover retrofit activity as well as new construction. As such, PEC’s emphasis shifted to an orientation whereby technical staff give facility managers specific and highly pragmatic information on what types of measures to install and how to better operate their facilities, with less weight on why and the theory behind proper design and energy efficiency.

Targeting building owners and operators and emphasizing reduced maintenance, improved tenant/worker comfort, lower energy costs, and higher value for the building has broadened the reception of the Center’s message. Annualized Center participation figures for 1994 indicate that more service hours were spent with facility managers/operators in consultation than with any other professional class on any other service at PEC. Owner/developer/architects show the next to highest level of participation.[R#22]

PG&E’s understanding of who the Center’s customers are and how they utilize resources at the Center has helped PEC’s marketing strategy to evolve. This includes an important focus on market segmentation, a strategy whereby different services are provided for professionals with differing tasks and levels within an organizational. Technical consultations, for example, are directed toward facility managers while exhibits and demonstrations are effective for architects and designers. Each staffer at

PEC has specific responsibilities with client types such as professional associations, governmental, and environmental organizations. For instance, two key staff are responsible for “architect” client communications while Technical Director Jim Chace has responsibility for communications with technical organizations such as the Lawrence Berkeley Lab, Electric Power Research Institute, and Oak Ridge National Laboratory.[R#20]

Successfully attracting customers’ attention to the Center was initially a challenge. PEC has used numerous approaches to lure decision makers from the design community to the Center, from lunches to drinks, free seminars and courses that require a fee. Jim Chace reports that the best success that PEC has had is in tailoring seminars and presentations to specific customers and their specific needs. Architects have been easy to attract to the Center; Chace has found that they use the heliodon 2-4 times a week. The most difficult groups have been HVAC engineers and especially lighting designers. To make sure that PG&E’s customers benefit from its services related to these end-uses, the Center has effectively marketed to these areas by directly targeting IES and ASHRAE members who are also PG&E customers.

There are several means by which PEC’s capabilities have been introduced to PG&E’s customers including broad-based marketing strategies and targeted efforts such as tours and technical presentations. The Center maintains an extensive database of design professionals that it can use for direct mailings. The Center has also promoted its video and software collections to customers to make customers aware of the Center and how it can help them cut costs, increase productivity, and assure environmental responsibility. PG&E customers (and staff) can call the Smarter Energy Line (1-800-933-9555) to register for programs and other activities.

National accounts pose another marketing challenge for the Center. PEC staff have given considerable attention to targeting chain stores and other retail outlets that have numerous facilities across the country and which are often managed from a central location that may or may not be in the San Francisco Bay area. In many cases these businesses use national specifications for construction and remodeling, posing a tough bar-

rier for energy efficiency. On the other hand influencing national accounts in California can affect national specifications, creating a far greater effect.

INTERNAL MARKETING: TO UTILITY STAFF

Clearly one of the most important transitions that PEC has been through has been its realignment with PG&E's Marketing Department and its marketing representatives (reps). PEC's challenge was to convince these reps that the Center indeed has a lot to offer for them and their customers. Breaking reps' hesitation to exploit this asset that they have at their fingertips has been a major challenge.

Beginning in 1993, PEC staff began to aggressively market the Center to their fellow colleagues in the Marketing Department for two purposes. First, PEC staff wanted to get reps to use the Center for their own education and as an ongoing resource. In fact, reps are given priority treatment to visit new displays at the Center. Each time a new exhibit is built to address opportunities for a new market segment, reps are provided with time slots before the exhibit is available to customers to familiarize them with the new tool.[R#20]

Another issue related to internal marketing is to get reps to bring their customers to the Center. This involves a rather delicate three-way interaction and has been a special challenge for the Center's effectiveness and has been addressed in a number of ways, including a special memo from PEC's former Director to the Marketing staff. It read, "The PG&E Energy Center is dedicated to assisting you in marketing energy efficiency to our customers." The memo was reinforced with a guide which not only spelled out the services available but which provided reps with tips for, "setting up a visit that has business impact." The guide suggests that PEC staff "can choreograph a program," but that reps must take the role of active sponsor to make the most of a visit.

To further the effectiveness of meetings in which reps bring their customers to PEC, the Center's staff recommend previsits to the Center to identify customer needs and specific objectives. At the previsit some customer market intelligence is done

whereby staff evaluate energy efficiency potentials. PEC staff also stress that reps conduct post visits with their customers as well to evaluate what technologies were indeed installed.

STAFFING REQUIREMENTS

For the vast majority of PEC's existence and until the fall of 1994, the Center was staffed with 23 full-time equivalents. (In addition to this core group, there were an additional five staff members at Exhibit Services located outside of PEC.) The staff consisted of a Director, a Senior Project Manager, a nine-member Technical Services team headed by Jim Chace, plus five employees working in Customer Resources, three in Client Relations, and support staff. Charles Benton, PEC's daylighting and pedagogical consultant, is also an associate professor at the University of California at Berkeley. Benton manages the Vital Signs Project (a UC Berkeley effort cofunded by PEC, The Energy Foundation, and the National Science Foundation) from PEC offices. He works one day per week directly for PEC. Finally, and of great importance to its mission, 300 PG&E field representatives promote the facility for PG&E's customers.

In the Fall of 1994, as part of a corporate-wide employee reduction program, PEC's staff was literally cut in half. Exhibit Services' function was eliminated. As inferred throughout this report, until DSM has a formal home and purpose at PG&E in a restructured utility environment, the Center's focus has been restricted to providing technical services to customers largely for the purposes of customer retention.

Monitoring and Evaluation

Tracking the visitors to energy centers is difficult, but possible and important, and has been done with a high degree of sophistication at the PG&E Energy Center. Not only are visitors tracked through a registration process but they are required to fill in a form that provides PEC staff with information on their profession, whether they are repeat visitors, and if so the date of the last time they were at PEC and why. Registrants can also sign themselves up for announcements of forthcoming PEC events.

Tracking the impact of Center visits, on the other hand, is that much more difficult and an imprecise science at best. How can the energy savings impacts or the job retention impacts of PEC visits be quantified? This issue has greatly plagued energy centers that have worked hard to justify their very existence to regulatory commissions keen on providing expenditure recovery and shareholder incentives only for programs whose impacts can be measured with a relatively high degree of accuracy. Clearly energy centers' impacts exist but are inherently difficult to quantify.

One means that PEC has considered to track its own impact is by using a line item check-off on PG&E rebate applications. By doing so, any customer that applies for a rebate would indicate whether or not the Center was responsible, or at least partially responsible, for the energy-efficient purchase. While this mechanism certainly seems logical, given the historical relationship between PEC and the Marketing Department representatives, PEC staff have been careful to make sure that they do not interfere with the relationship between reps and their customers. This has been most important because customer reps have specific DSM program goals as well as division goals to meet. Thus if PEC took credit for a slice of the energy savings, the reps would have less savings to report, and thus resentment between divisions, or in this case departments, could build.

Given the limitations on its ability to justify itself through energy savings, the PEC management has taken meticulous care in documenting the range of activities that have taken place at PEC, encapsulated in rather extensive, annotated quarterly tracking reports.[R#14]

EVALUATION

PG&E has evaluated PEC in a number of ways. In 1992, a visitor survey was conducted. In May of 1994 PEC's effectiveness was evaluated by PG&E's own Marketing reps to find ways of enhancing how PEC can support these reps' work with energy efficiency.[R#15]

BUILDING PERFORMANCE STUDY

Studies conducted by ADF Research in 1992 on actions taken by PEC visitors reveal that 68% of facility managers took action as a direct result of their visit to the Center along with 60% of building owners/managers. Conversely, only 46% of architects took action as a result of visiting the center. Likewise another study from the same source provides annualized figures for 1994 which indicate that more service hours are spent with facility managers/operators in consulting than with any other professional class, on any other service at PEC. Owner/developer/architects were next highest in terms of participation. Conclusions from these studies have helped PEC redirect and broaden its marketing strategy.[R#22]

THE 1994 REP SURVEY

A survey was conducted among PG&E reps to determine the overall performance of the PG&E Energy Center, proving areas of usage, awareness, satisfaction levels, and perceptions and attitudes regarding selected job performance and concerns. Three hundred and forty surveys were mailed, 171 or 50% were completed and returned.[R#16]

Overall, reps rated the quality of PEC as high with 82% of respondents checking off the top two quality-rating boxes. Two-thirds of the reps rated themselves as "very familiar" with energy-efficient technologies. Geographically closer divisions are more able to use the Center and thus track its features more carefully.[R#16]

Fully 95% of the reps who responded were aware of PEC's classes; the PEC library (78%); accommodations for meetings

(78%); and customer consultations (79%). As many as 62% of the reps have had at least one meeting at PEC though utilization of the other services offered was low, classes/seminars (44%), customer consultations (32%), and library (22%). [R#16]

One of the key findings was that reps more familiar with energy technologies more frequently used PEC services than those with less familiarity. This led to additional steps at PEC to welcome reps with less technical acumen and less familiarity to the Center. In fact the survey found that one-fifth of all reps had never been to PEC. Key reasons cited for this were insufficient time and distance. Two-fifths of the reps had not brought a customer or design professional to the Center in the past year. [R#16]

THE 1992 VISITORS SURVEY

The 1992 Visitors Survey was carried out by PG&E's Customer Research and Measurement group using the services of ADF Research of San Rafael, California. ADF conducted the survey design, administration, and tabulation working with PEC staff and two customer research staff. The intent of the survey was to revisit the Center's goals and to figure out ways of making it more useful to and or more attractive to visitors. [R#15]

In 1992 there were 8,000 visitors to PEC. The survey, however, focused on the 1,882 of these who were involved in six specific disciplines: architecture, building owner/manager, energy consultant, facilities manager, HVAC/mechanical, and lighting designer, essentially PEC's prime targets. This is described as the "target population" for the sake of the survey. The survey first revealed the typical PEC visitor within the target segment is on average 46 minutes from the Center and is most likely interested in commercial applications, and is an architect. [R#15]

The survey also found that most visitors come to the Center for meetings and seminars. Far fewer visitors came to solve specific problems or to take a tour or were generally curious and sought general information. There were a lot of repeat

visitors (a positive indicator in the Center's first year). Fully two-thirds of those surveyed had visited the Center more than once; the average number of visits for respondents was 3.8. Fully 91% planned to revisit in the coming year. Perhaps the best finding was that, "Almost everyone gets the information they need and expect from their visits." In fact, 95% of all visitors felt that the information they received by visiting was about what they expected (41%) or even more helpful (54%). Furthermore, the respondents claimed that the level of technical detail was also about right and were taking information away with them. Fully 78% of visitors have taken handouts from the lobby; three-fourths of these actually used them later! [R#15]

The survey was also valuable in determining the usefulness of the Center. Overall usefulness rated 7.5 on ten-point scale, with facilities managers tending to give even higher ratings. The survey also found that half of all visitors actually take action as a result of having been to PEC. Of the facility managers who were surveyed, 68% took action as a direct result of their visit to the Center, along with 60% of building owners/managers, with lighting retrofits the most common actions followed by motor and HVAC upgrades. Conversely, only 46% of architects took action as a result of visiting the Center.

The survey found that PEC's promotions are working. Respondents have a high recognition rate of the Center's newsletter and readers rated its usefulness 6.6 on a ten-point scale. Additional promotional tools such as free videos generated a positive response as well; 66% of the respondents indicated an interest in receiving free videos. Fully 90% of facility managers surveyed expressed interest in the videos as well. The survey also polled participants regarding PG&E's DSM incentive programs, and found a 92% awareness rate of the incentives among PEC visitors. [R#15]

Program Savings

One of PEC's greatest challenges has been quantifying its effect. This problem is not only related to energy centers, but to education programs of all kinds, and becomes especially problematic when utilities seek to justify and recover DSM costs for these programs. Clearly, education is an important and key driver in influencing customers' energy efficiency decisions, but how much can utilities spend educating their customers?

PEC has been a leading energy center in terms of quantifying its effect. While savings continue to be elusive, extensive tracking of visitors and their specific areas of interest has resulted in an indication of savings activity. Nevertheless, this section will primarily focus on participation.

PARTICIPATION RATES

Participation for PEC is defined as the number of visitors to the Center. The Participation Table presents quarterly numbers of visitors to PEC. Between the time that PEC opened its doors in December of 1991 and the end of 1994, approximately 30,890 visitors have come to the Center. (Note that participation for the third and fourth quarters of 1994 are estimates based on

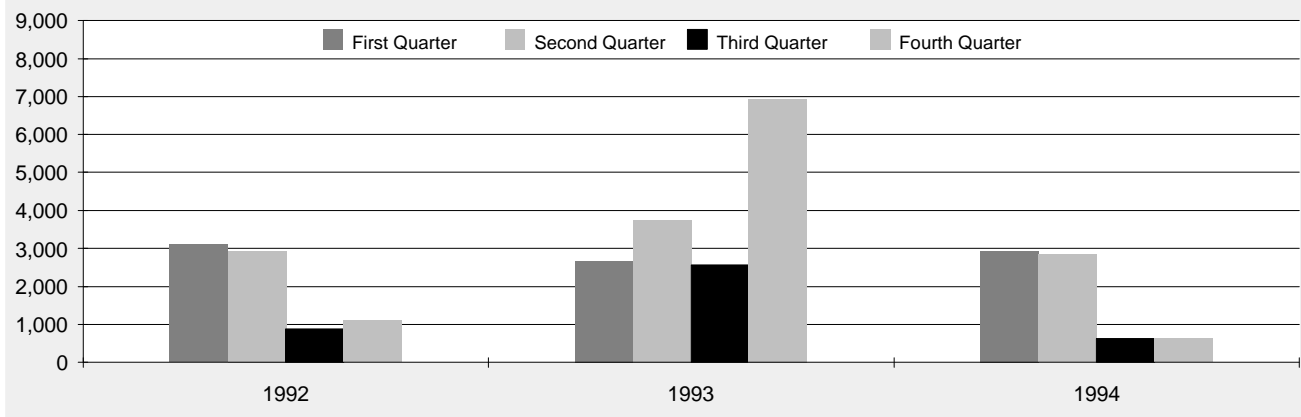
subtracting actuals for the first two quarters of 1994 from the reported annual figure.)

In 1992, PEC had 8,000 visitors. Roughly 73% of these visitors were within PEC's defined target market of building and design professionals and 18% were PG&E employees. In 1993, participation nearly doubled to 15,890 of which 66% were design and building professionals, with many of these visiting more than once. PEC also received 1,403 out-of-state visitors, 500 international guests, and 803 students in 1993.[R#14]

The first two quarters of 1994 have had 5,751 visitors to PEC. Educational seminars comprised 19% of all 1994 visitors; design and building professionals (45%); marketing organization events (12%); targeted professional associations (3%); and other designations (21%). In the latter two quarters the rate of visitation dropped as PEC officials refashioned the Center to reflect the company's new missions. Nevertheless, in 1994 there were approximately 7,000 visitors to the Center in total while activities included 114 General Technical Presentations, 40 Educational Seminars, 105 Customized Technical Presentations, 141 Project Consultations, 1,183 Information Research

<i>PARTICIPATION TABLE</i>	<i>FIRST QUARTER</i>	<i>SECOND QUARTER</i>	<i>THIRD QUARTER</i>	<i>FOURTH QUARTER</i>	<i>TOTAL</i>
1992	3,100	2,926	874	1,100	8,000
1993	2,661	3,743	2,559	6,927	15,890
1994	2,927	2,824	624	625	7,000
Total	8,688	9,493	4,057	8,652	30,890

PARTICIPATION BY QUARTER



Consultations, and 156 Tool Lending Library Service transactions.[R#14,26]

The Center has also attracted visitors from around the United States and around the world. Utility company personnel that have visited the Energy Center include Dayton Power and Light, Hawaiian Electric Company, Pennsylvania Power and Light, Georgia Power, Ontario Hydro, Philadelphia Electric, South Carolina Electric and Gas, and Tokyo Electric. The Center has welcomed international visitors from around the world including the countries of Thailand, India, Italy, Portugal, Saudi Arabia, Taiwan, Japan, Czech Republic, Russia, Canada, England, Brazil, France, Poland, Spain, Switzerland, Australia, Germany, Israel, Morocco, and many more. Other distinguished visitors to the PEC have included U.S. Secretary of

Energy Hazel O'Leary and celebrities such as Jane Fonda who caused such a commotion that the Center had to be closed down for her entire visit![R#14]

While the list of visitors and VIP guests is extensive and impressive, PEC has now reeled in its welcome and staff have been directed to focus exclusively on PG&E customers. The new PEC leadership insists that the Energy Center is not intended to attract masses of the general public, using PG&E ratepayer money to fund its services. Instead, its focus has been on attracting local decision-makers to affect change within the utility's own service territory. In fact, in its three-year history, more than 30,000 decision makers have walked through the door, an exciting opportunity that PG&E hopes to fully exploit in the coming years.

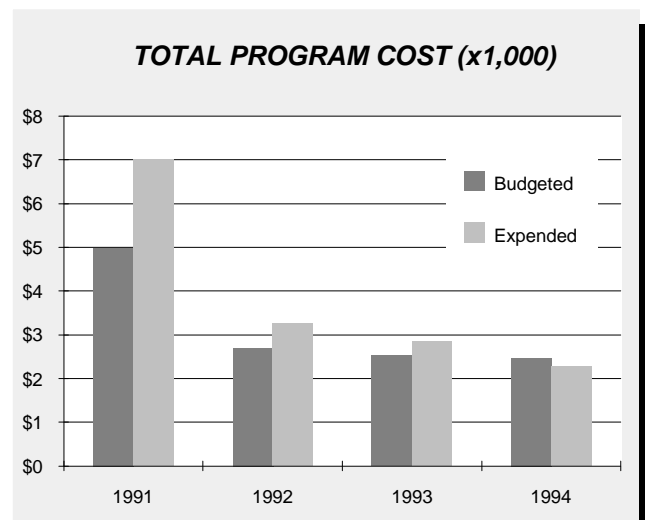
Cost of the Program

To date, \$14 million has been spent for the construction and operation of the PEC since renovation began in 1991. (The nominal, unlevelized amount is \$16.6 million.) This is \$1.3 million over the \$12.7 million budgeted for the Center and an indication of the quality embedded in PEC. PEC is a classy, highly sophisticated, and technically awesome facility,... features that have added to its costs and effect.

Construction costs are broken down into two phases: planning and design, and construction and initial exhibits. Planning and design for the PEC began in 1990. Planning and design expenditures were associated with internal planning, scoping, market research and center design. These expenditures were \$521,000 for 1990 and \$492,000 for 1991. Construction and initial exhibits began in the second quarter of 1991 and were substantially completed in December of that year. Expenditures for construction and initial exhibits include demolition, tenant improvements, furniture, and exhibit design and construction. In 1991 the vast majority of the Center's \$7 million operating budget was spent on construction. [R#17]

Operating costs for the Center include facility costs (rent, janitorial, etc.), labor, marketing materials, support for events, technical consultation services, the costs associated with the Energy Resource Center, and education programs. For special meetings jointly held between PEC and other PG&E Divisions, PEC staff costs, exhibit tools, conference facilities, and set-up are covered by PEC's budget while the Divisions must cover the costs of food, specialized equipment, expert speakers, etc. [R#20]

<i>COSTS OVERVIEW</i>	<i>BUDGETED (x1,000,000)</i>	<i>EXPENDED (x1,000,000)</i>
1991	\$5.0	\$7.0
1992	\$2.7	\$3.3
1993	\$2.5	\$2.8
1994	\$2.5	\$2.3
Total	\$12.7	\$14.0



Lessons Learned / Transferability

LESSONS LEARNED

Energy centers are a powerful tool for raising customer awareness of energy efficiency: Unquestionably the PG&E Energy Center is an effective tool for raising customer awareness of the potentials for energy efficiency. The Center has exceeded its initial expectations in terms of customer interest and participation. PEC has become a mecca of sorts, supporting a wide range of applications of the wise use of both electricity and gas.

Energy centers are burdened by the inherent difficulty they have in quantifying their effect: While few dispute the merit of energy centers in principle, utilities such as PG&E have had difficulty justifying their energy centers. As rather costly investments that they must recoup through the rate base, there is a constant dynamic in which the efficacy of the energy center approach is challenged, a struggle that forces energy center staff to have to be perhaps overly defensive of their work and import to the company. Investor-owned utilities such as PG&E seek to expense their operating costs and thus must gain regulatory approval to do so.

PEC has proven that it is possible to carefully document participation as a measure of the Center's effect: Through surveys and record keeping, careful track has been kept of the professional classes whose use has dominated the Center, for what purpose and for how long, and most importantly, how they have applied PEC's resources. Where savings can be quantified, such as with the Tool Lending Library, they have been. The PEC has taken its documentation to an extreme in order to make the point that the Center has made a measurable impact on its target market.

Closely related to justifying energy centers is their role in a more competitive utility environment: The PG&E Energy Center, like many other DSM programs across the United States, has been heavily impacted by the megatrends in the industry. Does the Center have merit as a tool for customer retention? Can it be refashioned to more closely meet the needs of the customers which we need the most? In response to these fundamental questions, PG&E has taken several steps in regard to the Energy Center:

First, the utility has cut the Energy Center's staff by a half, eliminating much of the customer outreach aspects of the Center and using the facility more for more technical consultations and meetings which the utility hopes will result in significant value to all parties involved. General tours have been eliminated, in fact visitors from afar can now pay for a tour of the facility. Clearly the Center has become more attuned to profitability, a function of reducing its costs and refining its competencies to garner maximum benefit through a highly targeted approach. In addition to providing technical services and important consultations, the staff is currently considering a range of services, such as power conditioning and environmental compliance, that the Center might offer in the future to better align its mission with the coming competition.

Despite competition, PEC has not focused on large industrial customers: PEC is not focused on PG&E's industrial sector for at least two reasons. First, staff recognize the difficulty with effectively addressing industrial users' needs given the plethora of manufacturing processes in Northern California. In Los Angeles, where Southern California is located with its Customer Technology Application Center (CTAC), there is a concentration of coatings in use — lacquering furniture, painting cars, etc. — that provided a clear focus for CTAC. Around San Francisco there does not appear to be a similar concentration, making an industrial focus for PEC more difficult.

Second, with increased deregulation in the electric utility industry, large "non-core" customers may leave the utility anyway, regardless of how much PG&E spends on them at PEC. They are looking for commodity prices and to find the best deals they will use brokers that place little if any value on the educational aspects of energy centers the likes of PEC.

A key issue which the Center has addressed is the level to which PG&E's customer representatives have utilized the Center: Although some reps found the Center an effective tool for working with their customers, many of the reps did not understand what the PEC was about. As a result, they were not bringing their customers into the Center, nor were they making use of its demonstrations, labs, exhibits, and reference tools. ➡

Lessons Learned / Transferability (continued)

In order to work more successfully with customer representatives and make it their center, PEC has been realigned closer to the core in PG&E's organizational design, in the Marketing Department. Thus in 1993 the Marketing Department became an integral part of the Center, facilitating the coordination between PEC's educational materials and incentive programs offered by the reps to PG&E's customers.[R#20]

Locating the Center squarely in the Marketing Department has resulted in the implementation of guidelines as well as responsibilities for each rep to use the Center. In turn, the Marketing reps have developed some creative approaches to applying the resources at the Energy Center to its more distant customers. One rep who hosted a group of customers from some distance away at the Center conducted a miniseries on the bus ride to and from the Center. Other reps have scheduled visits to the Center in conjunction with exhibits at the Moscone Center.

With this reorganization, the PEC now answers directly to Marketing and Sales. Ultimately, this will not only make PEC a stronger marketing tool, but will allow for consolidation between technical staff in the marketing department and at The Energy Center.

PG&E clearly views the Energy Center as its most positive icon and powerful public relations tool: Visits from VIPs such as U.S. Secretary of Energy Hazel O'Leary, as well as hosting other high-level visitors, has given PEC impressive exposure which has certainly translated into a positive image for PG&E. The Center personifies both PG&E's focus on the future and the future's focus on customer service.

Renaming the facility the PG&E Energy Center was essential for proper positioning: Originally, PEC was known as the Pacific Energy Center. However, concerns that the Center was not being identified with PG&E prompted a name change to the PG&E Energy Center. Although initially confusing, renaming the Center has clarified questions regarding PEC's source of funds and its role within PG&E, strengthening its position in a more competitive environment in which the utility must be clearly associated by customers as the provider of valued goods and services.

The decision to locate the Center in downtown San Francisco serves the purpose of central accessibility for PG&E customers and high exposure for the Center: PG&E, whose territory ranges from Bakersfield to Oregon, understood the importance of selecting the right location for the Center, and considered many venues. The downtown lo-

cation makes it easy for the press to feature the Center. In fact, in its first six months the Center was repeatedly featured in press, magazines, and on local television. This venue also clarifies the PEC's focus on office space, which predominates the downtown area, yet maintains a reasonable proximity to PG&E's related learning centers in San Ramon and Stockton.

Locating the residential center in the front lobby enables customers to collect practical tips on what to do in their own residences before exiting the Center: Technical Director Jim Chace observed that nearly all technical meetings in which he's involved have ended with discussions of energy-efficient measures for participants' own homes. This has been greatly facilitated by the presence of the Residential Center in PEC's lobby. Before and after meetings, and between sessions, visitors are exposed to a range of residential strategies and technologies. Thus the location of the Residential Center has been highly effective. The configuration also supports Christine William's role as Residential Specialist and hostess to foreign and distinguished visitors. They too tend to be drawn from their professional roles to their roles as responsible and cost-cutting homeowners.

The staff at PEC recognizes the value and importance of the walk-in customer, despite the fact that the direct effect is minimal with respect to the time spent with these customers: One solution to satisfying the walk-in customer which PEC is exploring includes the possibility of an audio tour, with text, which will allow the walk-in customer to visit the Center at his or her own speed. This would enable the Center to enhance its role as host and minimize its cost with reference to the staff. This audio tour might also have internal applications, such as serving as a training tool for the marketing representatives.

Understanding the seasonal patterns of the Centers activity has enabled the staff to schedule ahead for further development: According to the staff, activity at the Center fluctuates dramatically throughout the year, with regular seasonal cycles that staff can now use for advantage. During the months of July and August, participation is so minimal that the Center "might as well close." Another lull in participant activity occurs in November and December. Now staff takes advantage of these periods by using the summer months for planning and the winter months for construction and change-outs.

In order to effectively influence to the design process, it is vital for the PEC staff to understand its timing and developmental elements: Key to PEC's success with the architectural and design community has been its inside knowl-

edge of the design process. Timing is of critical importance and key to getting energy-efficient measures implemented into a new design. If decision makers are made aware of efficiency options too late, expensive change orders may be required if possible at all.

The PEC recognizes that legal restraints create a fine line when providing technical consultation and equipment recommendations to its customers: While the Center understands that its customers seek specific recommendations with regards to equipment and applying technologies, there remains an anticompetitiveness issue with which PEC staff must be sensitive. PEC does not want to imply endorsements of specific products to its customers, or become the “engineer on record” in a design process. Thus staff must make objective and strong recommendations, stopping short of endorsing either a product, design, or contractor.

Changes for the PEC as well as for the industry have meant growing pains for its technical staff: One challenge that energy centers face, Jim Chace noted, is that to provide effective technical services, there is a need to develop skills sets and a need to maintain staff consistency. PG&E’s repeated reorganizations have upset this consistency, weakening the effectiveness of PEC’s technical staff.

The Center’s management has also had to address the fact that the technical staff has generally been comprised of “free thinkers” who’s creativity is essential for working with customers and devising clever solutions to their unique problems and needs but who tend not to be well versed in budget constraints and regulatory issues. In essence, PEC was a form of utopia for these staff, now having to adjust to the realities of the utility business in regulatory transition. Additionally, the technical staff at PEC has had no private sector experience. Accustomed to free – even lavish – spending in the Center’s early years, they are now having to cut back.

TRANSFERABILITY

Energy centers represent an important program strategy for utilities and energy ministries worldwide. In addition to well-known U.S. examples such as PEC, Southern California Edison’s CTAC (see Profile #84), the Northwest Lighting Design Lab (see Profile #27), and Portland General Electric’s Energy Resource Center (see Profile #55), The Results Center has documented energy centers in Denmark and Germany, where they are well-established aspects of energy efficiency programs, and in Asian countries including China, Indonesia, Japan, Pakistan, and Thailand. There, energy centers provide

key links between the potentials and applications of energy efficiency, often coupling residents and businesses with energy services companies.

Energy centers can serve a wide variety of roles. PEC initially focused on design professionals and new commercial office construction, and now has broadened its focus to include facility owners and operators. CTAC is focused on working with customers’ environmental compliance in the Los Angeles basin and San Fernando Valley; Southern California Gas recently opened an energy center in Los Angeles with the goal of promoting the wise use (and more use!) of gas. The Lighting Design Laboratory is perhaps the most focused of all, all done with relatively low cost and remarkable success. Energy centers in Europe have generally been focused on residential applications, while in Asia energy centers have served the commercial, industrial, and agricultural sectors. In Indonesia, for example, the KONEBA energy center promotes more efficient tractors. Identifying which customers to target and what their specific technological demands are, for instance cooling equipment in the South, will be the starting point for utilities planning on exploiting this efficiency strategy.

Energy centers can be highly effective serving as a core for a utility’s energy services programs. But they do bear a cost. Thus utilities may want to consider interesting collaborations for partnering. PG&E has considered relocating PEC at the Presidio, a large tract of invaluable land recently turned over to the National Park Service from the U.S. Army. A sustainable energy institute is planned for the site, providing a possible venue for PEC. Lighting Design Lab provides another model of collaboration, with about a dozen utilities contributing to the Lab’s operations. Neighborhood energy centers, like the ones used in Philadelphia and other cities to deliver a range of social services, provide another strategy for incorporating energy and water efficiency into communities. On a grander scale, the National Energy Policy Act of 1992 called for ten regional energy centers spread across the nation.

For PG&E, its Energy Center has projected a highly positive image of the utility to its customers. This is highly important especially as utilities become more competitive. PEC has also provided a valuable marketing tool for its marketing representatives as well as a strong and easily accessible technical reference for its customers. Thus, where there is a political will to support energy centers, as utilities’ expenditures are regulated, energy centers can be highly attractive and valuable additions to communities and utility service territories.

Regulatory Treatment

The purpose of this section is to briefly discuss the regulatory treatment of the costs of Pacific Gas & Electric's Energy Center. To do so, a brief review of the regulatory treatment of all PG&E's DSM programs is presented to illustrate the overall regulatory context within which PG&E operates its DSM programs. This is followed by the specific regulatory treatment of the PG&E Energy Center. More comprehensive discussions of the regulatory treatment of California's utilities regarding DSM, and specific treatment of PG&E's programs, can be found in Profiles #4, 14, 25, 33, 75, and 81.

Since 1990 Pacific Gas & Electric has been eligible to receive earnings by successfully implementing energy conservation programs thanks to the California Collaborative. The California Collaborative built on the State's precedent-setting 1982 Electric Revenue Adjustment Mechanism (ERAM) which decoupled sales and utility profits and effectively removed the disincentive for utilities to invest in their customers' energy efficiency. The Collaborative pushed beyond removing the disincentives to DSM and created a situation in which utilities are allowed additional incentives for their successes with demand-side management.

For the purpose of determining shareholder incentives, PG&E has three types of DSM programs: Resource, Equity, and Demonstration. Each of these is eligible for a different level of shareholder incentives. Resource programs, whereby the utility directly buys energy resources from its customers and which include most of PG&E's core incentive programs, are eligible for shareholder incentive treatment. Equity programs, including educational efforts, are also eligible for shareholder incentives although to a lesser degree than Resource programs. Demonstration programs are by definition not yet proven resource alternatives and are thus not eligible for shareholder incentives.

Funding authorized for the Pacific Energy Center for both construction and operation has been expensed for cost recovery purposes. As one of PG&E's information programs – whose impact cannot be measured – its costs have been recovered dollar for dollar rather than capitalized and ratebased as capital equipment. No shareholder incentives have been received for the program nor have there been any lost revenue adjustments associated with PEC.[R#5,17]

References

1. Pacific Gas and Electric Company, "1993 Annual Report: On Course in Changing Times," February 1994.
2. Pacific Gas and Electric Company, "1994 Annual Report: Blueprint for Success," February 1995.
3. The Pacific Energy Center, overhead transparency series that provides overview of the Center's purposes and features.
4. Judith Olney, former Director, PG&E Energy Center, Pacific Gas & Electric Company, personal communication, August - September 1994.
5. Jim Chace, Technical Director, PG&E Energy Center, personal communication, August 1994 - July 1995.
6. Tom Patterson, Acting Team Leader, PG&E Energy Center, personal communication, August - September 1994.
7. Christine Williams, Residential Specialist, PG&E Energy Center, Pacific Gas & Electric, personal communication, August 1994 - May 1995.
8. Peter Schwartz, Marketing Department, Pacific Gas & Electric, personal communication, August 1994 - August 1995.
9. "Synergy: Energy Professionals Working Together," News from the PG&E Energy Center, Winter/Spring 1994, Pacific Gas & Electric Company.
10. "The PG&E Energy Center," Pacific Gas & Electric Company, Fact sheet.
11. "Fact Sheets: Informational and Technical Subjects Concerning Building Performance," PG&E Energy Center, Pacific Gas & Electric, July 1994.
12. "Vision" and "Positioning the Center" statements, PG&E Energy Center, Pacific Gas & Electric Company, undated.
13. James Newcombe and Brad Gustafson, "PG&E's Tool Lending Service: Helping Customers Collect and Interpret Data on Building Performance," E-Source Tech Memo, August 1994.
14. "PG&E Energy Center Measures of Success Summary[ies]," Second Quarter 1994, First Quarter 1994, 1993 Year-End Report (July - December 1993), Third Quarter 1993 Report, PEC 1993 Mid-Year Report, Second Quarter 1993, First Quarter 1993 Report, First, Third and Fourth Quarter 1992 Reports, First Half 1992 Report.
15. "Pacific Energy Center, 1992 Visitors Survey: What do Visitors Use and Value?", Preliminary Findings, Customer Research and Measurement, Pacific Gas & Electric, May 1993.
16. "PG&E Energy Center, Rep Survey," Final Report, May 1994. RJR 94-236.
17. Letter to Ms. Michelle Cooke, Commission Advisory and Compliance Division, California Public Utilities Commission, dated December 3, 1993, sent by Betsy Dixon regarding costs and operational expenses of the PG&E Energy Center.
18. Conservation and Energy Efficiency Accomplishment Summary, prepared for U.S. Secretary of Energy Hazel O'Leary's visit to PG&E and the PEC, undated.
19. "Retrofits: Retrofit Opportunities for Energy Efficiency", Pacific Energy Center, undated.
20. "How to Use the Pacific Energy Center to Get Business Results," memo to the Marketing Leadership Team, from Judith Olney, former Director, PG&E Energy Center, Pacific Gas & Electric, July 9, 1993.
21. The PG&E Energy Center Staff List, June 14, 1994.
22. "Building Performance Services: Energy Efficiency, Occupant Comfort, Building-Owner Value," Pacific Energy Center, undated.
23. "PG&E's Tool Lending Library," Brad Gustafson, June 1994.
24. "Office Tenants Moves and Changes", Building Owners and Managers Association (BOMA) International.
25. Pacific Gas & Electric Company, "1993 Financial and Statistical Report," 1994.
26. Pacific Gas & Electric Company, "Annual Summary Report on Demand-Side Management Programs," and "Annual Summary Report on Demand-Side Management Programs Technical Appendices," March 1976 - April 1995.
27. Charles C. Benton, Resident Architect, PG&E Energy Center, personal communication, May 1995.