Filling in the Missing Pieces in Utility Programs to Create a Total Energy Solution

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ABSTRACT

Utilities typically use site surveys, rebates, and/or financing to promote energy efficiency retrofits to their commercial and industrial customers. For many customers, these services are not enough to implement a project, or other services would be more valuable. This paper discusses field results from Pacific Gas and Electric Company programs that complement the above-mentioned standard utility programs. The first program is a benchmarking and energy efficiency profitability analysis that helps customers formulate an overall corporate energy strategy. The analysis considers energy efficiency as a profit-enhancing strategy using the same criteria the company applies to other business investments. The results of this service help the customer determine how much money to invest in energy efficiency and in which facilities to start. The second program is design and implementation assistance that covers engineering pre-design studies, bid preparation, bid review, and project facilitation in place of rebates. These services address important market barriers that are often ignored but are particularly critical to the initial phases of large, complex projects. The third program is an on-line vendor referral service maintained by the utility but with marketing funded by participating vendors. This service allows the utility to make referrals without improperly promoting individual businesses, gives customers the information they need to make informed purchasing decisions, and lets customers select qualified local vendors that stock energy-efficient equipment. These three programs, in conjunction with the previously offered services, provide more customers with a total energy solution.

Introduction

Traditional utility demand-side management (DSM) or energy-efficiency programs have assumed that customers either don't know what projects to do or need money to shorten the payback period. For this reason, they have focused on two primary services: site surveys and incentive money; usually in the form of rebates.

Site surveys are offered to customers as a way to *get started* on energy efficiency improvement projects. They provide a more-or-less detailed description of a building's lighting, air conditioning, and other energy uses and suggestions for cost-effective improvements. Site surveys typically provide retrofit costs, savings, and payback information. This service is valuable because it identifies what could be done to improve building operations. Rebates are designed to provide customers with an extra "spur to action". By helping offset the purchase price of energy-efficient equipment and setting deadlines, they can get customers to take action now rather than putting it off. The program deadline often seems to be what really drives the project to completion, more so than the incentive level.

Many utilities offer at least one type of financing, but this service is rarely marketed aggressively. It tends to be an additional "tool in the toolbox" that rarely gets used. Often financing is offered through a third party source and most utility staff are not familiar with how to finance complex projects.

The Total Energy Solution Approach

Despite many utility-sponsored energy efficiency programs, there still remain a huge number of unrealized energy efficiency retrofit opportunities in the commercial sector (Komor & Moyad 1992). Anyone who works in the field sees many great projects that languish for years without getting done, despite outstanding potential in terms of internal rate of return, positive cash flow, or comfort and performance improvements. Pacific Gas and Electric Company (PG&E) and Energy Solutions have worked together for the past four years to try to identify what else stands in the way of these projects and provide utility programs that "fill in the missing pieces".

The first obstacle facing energy efficiency improvements is that often there are no major consequences if a retrofit project does not go forward. The building equipment will continue to function and staff are rarely held accountable for high utility bills. Additional barriers at any phase of a project may kill it, independent of the value of the project. Therefore, the approach we use is:

- Provide a project champion dedicated to overcoming all hurdles.
- Put energy efficiency investments in the same terms that a company's financial decision makers use to evaluate other investments: this moves energy efficiency higher up the priority list.
- Offer additional services that address the major market barriers at every stage of an energy efficiency project

Figure 1 on the following page shows the services and programs. The following sections discuss each of the services.

CustomNet - Creating a Corporate Energy Strategy

Facility managers at many large companies that lease or own multiple buildings are often unable to recognize and prioritize the energy-efficiency opportunities in their buildings, or lack the financial resources to do projects they know are cost-effective. PG&E has created a service called CustomNet for chain account commercial customers to overcome these barriers. CustomNet is a benchmarking and energy efficiency profitability tool that helps customers form corporate energy strategies and evaluate energy efficiency in a similar framework to other business opportunities. CustomNet is targeted to financial decision makers and uses their decision-making language (not kWh).

Benchmarking compares the energy costs per square foot of multiple, similar facilities on a whole-building basis. This enables customers to find out which of their buildings have the greatest energy savings potential. Because each report focuses on a single customer, PG&E is able to work directly with facilities personnel at the various buildings to include information which doesn't appear in billing records, such as what types of technologies are used for cooling or whether hours of operation vary between facilities. Weather variations are accounted for by working within a limited geographic area.

On analyses done to date, the per-square-foot energy cost of the least efficient and the most efficient facilities vary by a factor of two to four. This variation is found after accounting for operational differences. These results imply that the savings potential is large, building performance varies dramatically, and standard retrofits need to be paired with operational improvements. Often the

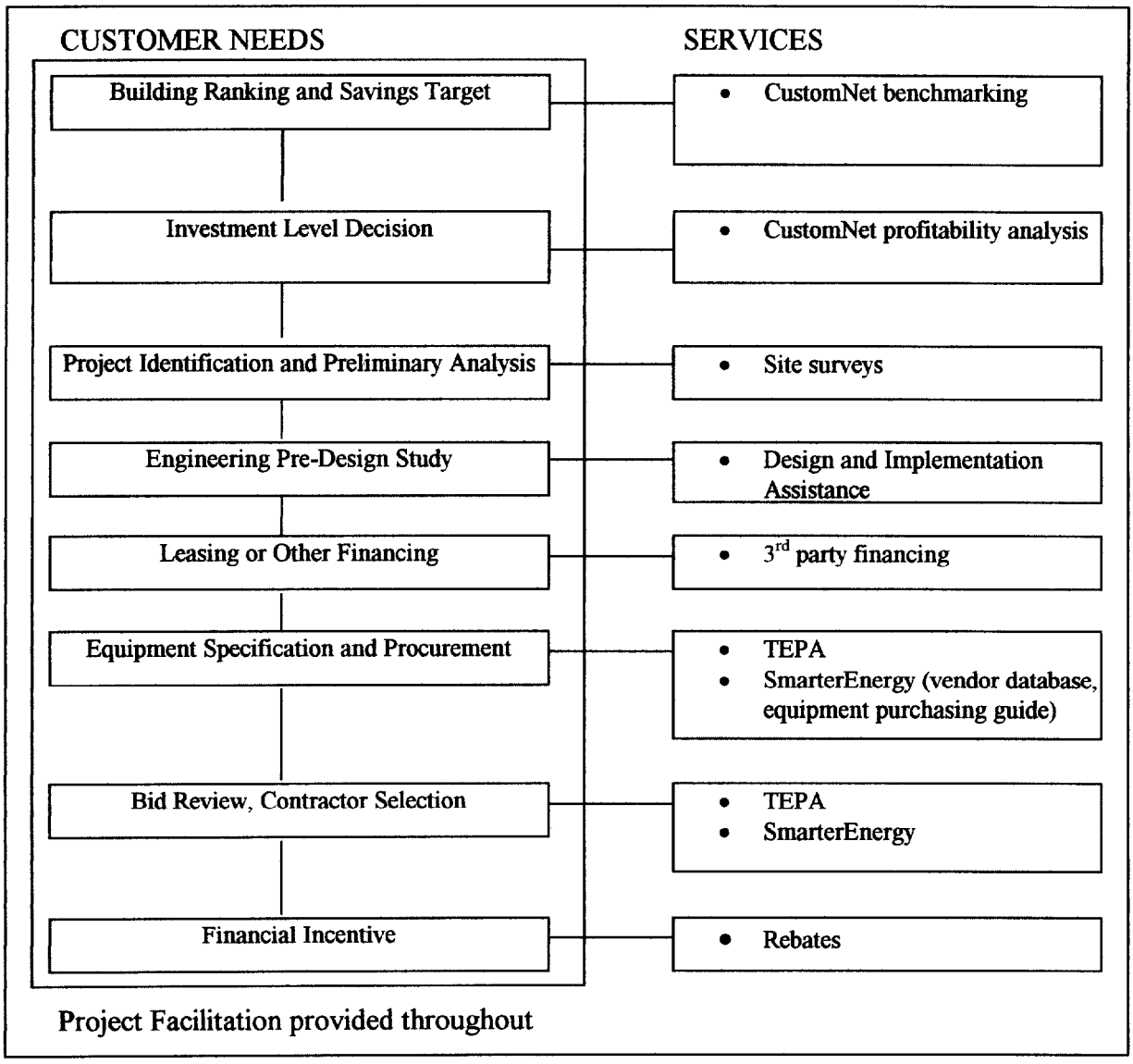

Figure 1. Customer Needs and Services

customer's perception of which buildings are the most efficient proves erroneous when the comparative results come in.

In addition to comparisons between a customer's different facilities, energy cost per square foot and intensity comparisons are also drawn to performance benchmarks such as the customer's own median, a typical competitor, and a typical competitor minus 15 percent. "Typical Competitor" data are from load research studies (such as PG&E, 1994) and developed through previous CustomNet analyses. Using energy intensities and performance benchmarks, we then calculate annual dollar savings that could be achieved by meeting the various benchmarks. For example, a customer might see the potential to save $1,300,000 per year in energy costs by bringing all of its buildings up to the efficiency of a typical competitor's buildings.

Figure 2 below is an example of a benchmarking chart comparing the energy costs per square foot and per building of the median (fictitious) Company X building against their own most efficient and

least efficient buildings and those of a typical competitor in the same line of business. The figure is intended to give a summary of the benchmarking report results for high-level decision makers who may not read the entire report.

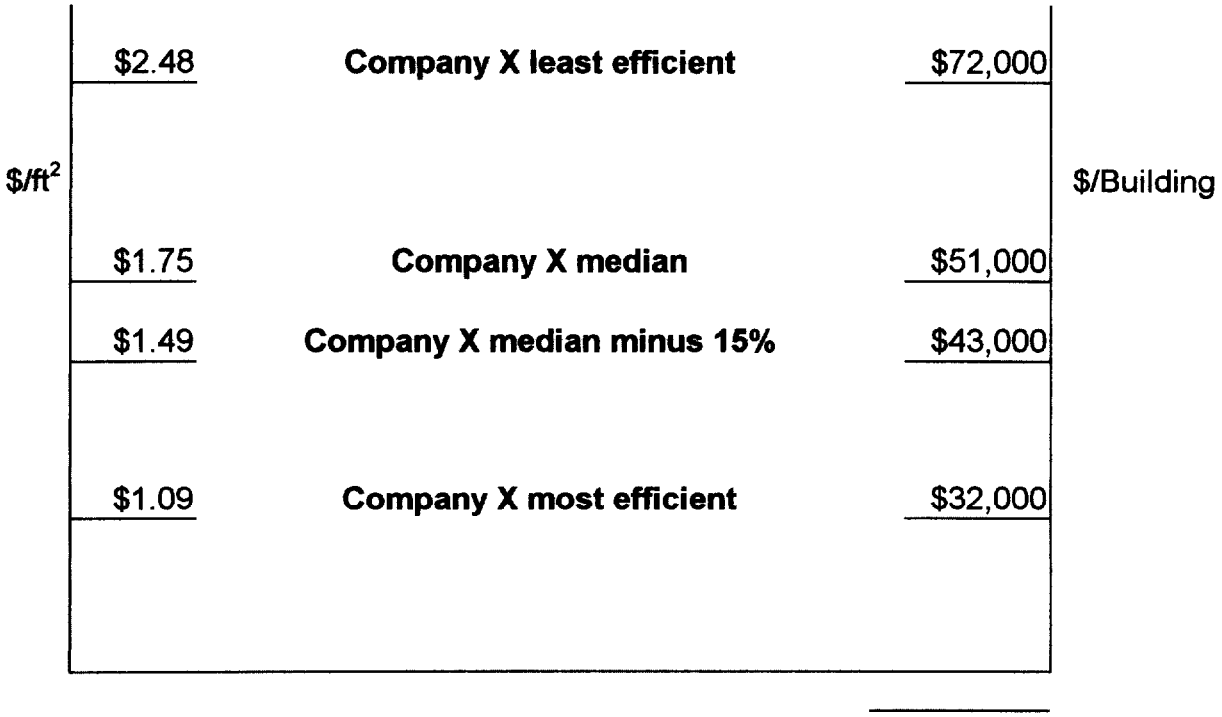

Figure 2. Annual Energy Costs for Company X

Figure 3 shows the variation in energy costs between different facilities for a real customer. Outliers are apparent. The customer can then investigate the high-consuming facilities to start looking for savings. In addition, the operation of the efficient facilities should be examined to determine what lessons can be transferred to higher consuming facilities. The factor of two to four variation in energy intensities we see is usually due to improper controls, often as simple as leaving the lights on. In these cases, capital investment is not required.

Energy efficiency profitability analyses are the next step after benchmarking. The profitability analysis builds on the benchmarking data and puts the potential savings in terms of bottom-line business results, making the leap from kilowatt-hours and energy costs to profit terms financial decision-makers can understand. Profitability analyses are offered separately from the benchmarking service because some customers are unwilling to share profitability information they consider confidential. However, much of the information is public in shareholder reports or promotional material. Profitability information can also be replaced with industry averages to help customers make investment decisions without sharing proprietary information.

Many customers are not interested in energy costs because they are a small percentage of sales. However, if energy costs are a significant portion of profits, energy efficiency is key to profits. For example, a grocery store with a 1.5 percent profit margin may be surprised to see a $1 reduction in energy cost expressed as equivalent to $67 in additional sales (see Figure 4). For many customers, energy efficiency can increase profit margins by five to fifteen percent.

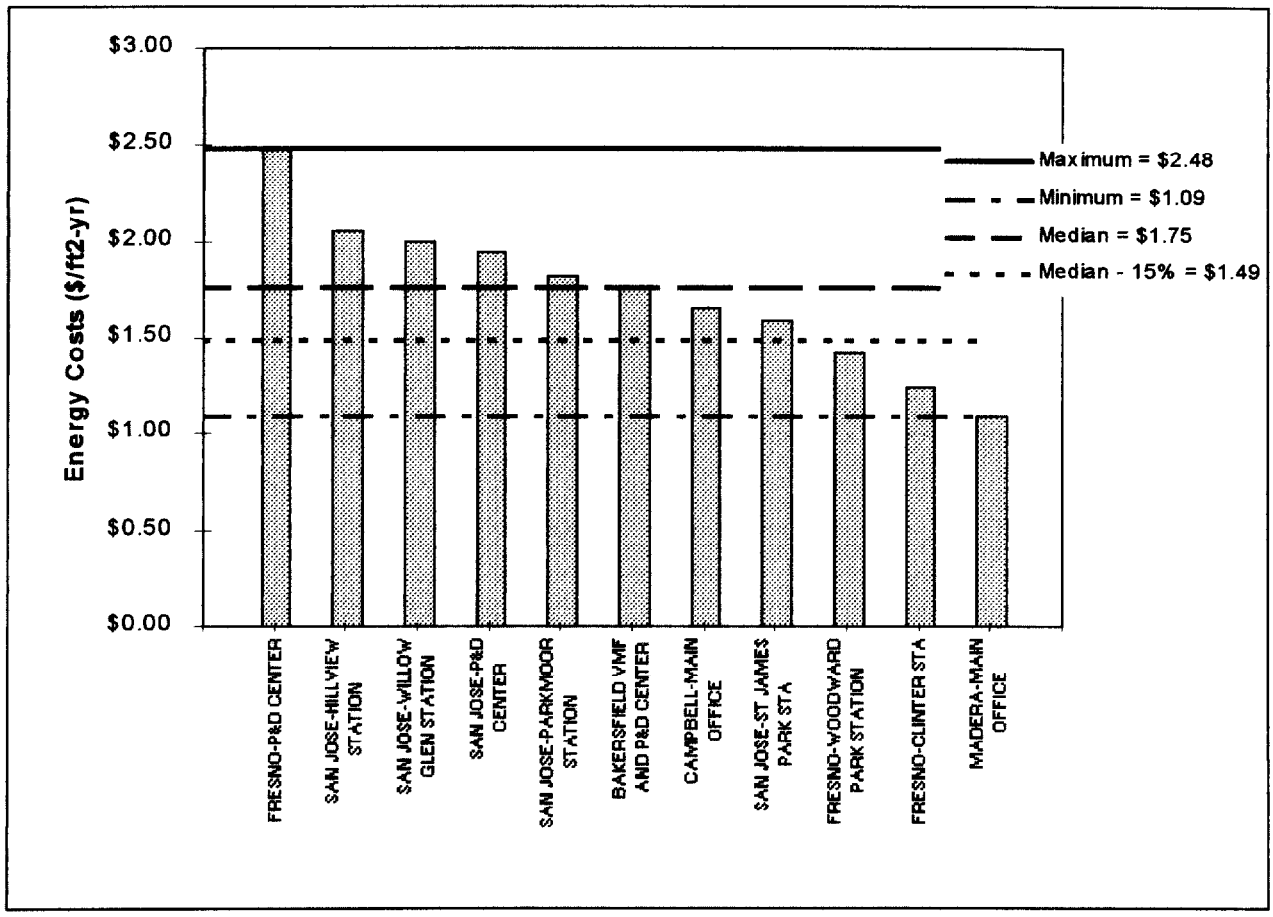

Figure 3. Annual Energy Costs per Square Foot for Company X

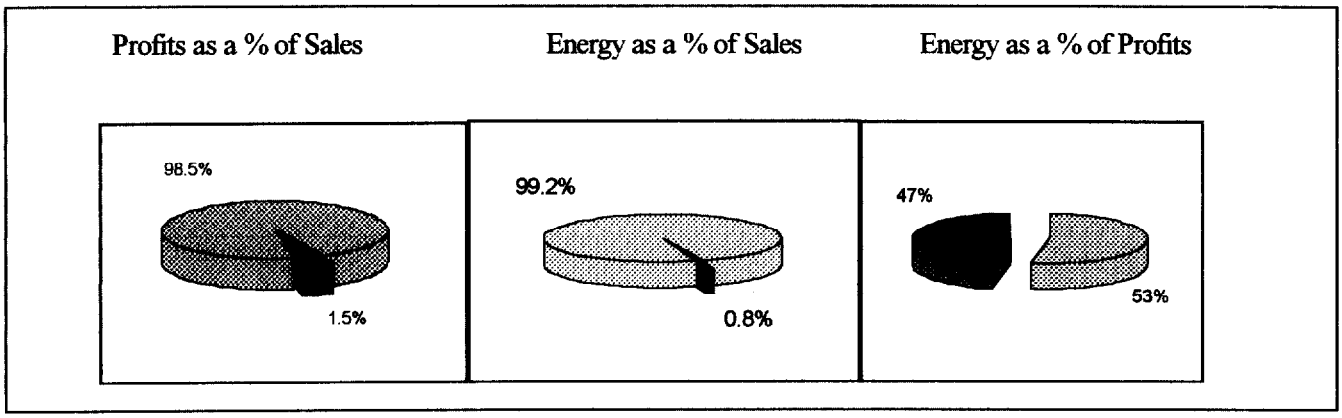

Figure 4. Energy Profits as a Percentage of Sales

Benchmarking is a simple task to perform, but only works well for certain applications. CustomNet analyses are best suited to customers with multiple facilities that are similar in function and climate. The approach works well for banks, drug stores, grocery stores, and office buildings. On the other hand, markets such as hotels and restaurants can be difficult because of the wide range of

variation in operations. For example, one hotel may outsource laundry, while another may have a restaurant, wash laundry in house, and have higher occupancy rates.

Tailored Energy Planning Assistance - Providing Project Services, Not Just Money

Once a customer has identified which buildings to work on, a traditional site survey can help them determine which projects (e.g., lighting upgrade, chiller replacement) might be cost-effective. Utilities typically provide free energy efficiency site surveys to identify potential projects and estimate project costs and payback periods. The level of detail generally depends on the size of the facility. Often the implementation percentage for these surveys is very low.

After the site survey, responsibility still lies with the customer to obtain engineering pre-design studies and other professional services needed to actually undertake a large, complex project. Many projects falter at this stage because customers don't know where to obtain such services or can't provide the up-front money to pay for them. Even if a customer can eventually do this work in-house, they would often prefer to outsource it to a trusted consultant or contractor. PG&E created the Tailored Energy Planning Assistance (TEPA) program to address these problems.

Customers pay for the program by having the services (described in detail below) deducted out of future rebates. For example, if a customer would have earned $50,000 in rebates for a lighting retrofit, but PG&E provided $10,000 worth of engineering services, then the final rebate to the customer would be $40,000. The utility subcontracts to firms with the exact expertise required. Tailored Energy Planning Assistance (TEPA) is particularly suited to public sector clients who have difficulty getting money up front and for whom rebate money would go to a general fund that does little to benefit their department.

Engineering pre-design studies. Engineering pre-design studies can be used to finalize energy savings and project cost estimates and also work out feasibility issues. This type of study is usually a prerequisite for obtaining financing. Pre-design studies are often an order of magnitude more expensive than a simple site survey. Substantial expertise and time are required to do pre-design studies on large projects.

Technical specifications. Technical specifications are used by the customer to purchase or install equipment themselves or put a project out to bid. Customers often need help sorting out equipment parameters. For example, in lighting retrofits most customers are confused about how to specify ballast factors, total harmonic distortion, power factors, and lamp color rendering index. This is a relatively easy thing for the utility to help with as they come across these issues on almost every project. PG&E has developed a database of electronic ballasts with this information and can provide search results to the customer. The ballast database, along with motors and air conditioner databases, are also available on the Internet. While most utilities cannot recommend individual manufacturers, they are allowed to provide a list of qualifying equipment from multiple manufacturers.

Bid review. PG&E will also review performance specifications of bids that customers receive from contractors. After reviewing the specifications, PG&E then shows customers where opportunities for additional cost-effective savings may lie. For example, a vendor will often tell a customer that a 10.0 SEER unit is 50 percent more efficient than their existing unit. While this is true, that doesn't mean the customer shouldn't consider a 12.0 SEER unit. On more complicated projects, the review will include

system integration issues, as well as performance parameters of individual pieces of equipment. PG&E does not review the cost portion of proposals since vendors provide differing levels of quality and service.

Project facilitation. Project facilitation is similar to project management, but the facilitator does not assume decision-making authority or responsibility for budget items. Instead, the facilitator ensures that a project continues on-track to completion. This person is the project's champion and the only person whose sole responsibility is to get the project done. This is particularly important for retrofit projects, which often languish for years because there is no urgent need to finish them.

Many large organizations do not have energy managers. For those that do, the manager's primary role is often to keep equipment functioning, not to minimize energy costs. In the case of cities, if there is an energy officer, typically this person is overburdened and is tasked with keeping the equipment on rather than minimizing energy use through implementation of all cost-effective projects (Wentworth 1998). For example, as this paper was being written, the authors received a call from a city energy officer who said that the 911 system had gone down and he would be unavailable to work on energy efficiency projects until the problem was fixed and all the city officials were satisfied of the system's reliability. Energy efficiency will always bat last in such a situation unless there is a project facilitator.

The project facilitator provides coordination between owners, contractors, and other consultants, assists with utility paperwork, offers technical advice, and generally "bird-dogs" the customer until the energy efficiency project is done. This is a different skill set and personality than engineering and is rarely the same person as the project engineer.

SmarterEnergy - Furnishing Additional Information to Get the Job Done

PG&E receives thousands of calls each month from customers who want referrals to vendors that install energy efficient equipment. Customers want access to a list of vendors that understand energy efficiency and will install the proper equipment. However, PG&E (like other utilities) can't recommend individual vendors.

On the other hand, vendors call PG&E and want access to lists of customers that are ready to do projects. They want hot leads to customers who are ready to take action. Companies allocate significant funds to marketing. In focus groups, even some small, family owned contracting businesses report spending $5,000 to $15,000 per month on advertising.

PG&E is developing a new web-based service called SmarterEnergy to link motivated buyers with suitable vendors. The service is largely funded out of vendor listing fees. Vendors pay $100 per month per store location. This money is then pooled and used to market the service to a broader audience through advertising in Yellow Pages, newspapers, journals, and direct mail. Fees are also used to fund quality control. Listed vendors benefit from the exposure of the program; PG&E benefits from facilitating energy efficiency projects for its customers; and society benefits from the exposure given to energy efficiency.

Vendor Search. SmarterEnergy will be housed on PG&E's web site and will provide both residential and business customers with a searchable vendor database. Customers input their market sector, equipment end-use, and county, and are provided with a list of vendors. Each vendor has a single-page listing to describe the products and services offered, special certifications and qualifications, client lists,

and links to their own web sites. Since not all customers have web access, PG&E will also provide a toll-free number to call for a hard copy of a specific search.

Quality control is an issue any time the utility is introducing customers to vendors. There are two ways to handle quality control for a program such as this. One is to aggressively screen vendors and to inform customers that the listed vendors have passed certain quality control requirements. Another is to development some basic quality control requirements and invest program dollars in program promotion, reserving the option to remove problem vendors from the list. PG&E has gone the latter route with SmarterEnergy by requiring a valid state business license and contractors license (if applicable) and liability insurance. Vendors are also required to stock at least one product which is promoted by PG&E rebate programs. Focus groups with vendors showed that while vendors did want PG&E to maintain some mechanism for removing problem vendors, they preferred to see program dollars go towards advertising. Customers are provided with information in the purchasing guide section of the web page to help them determine for themselves whether the vendor they choose is a good one.

Purchasing Guides. The idea behind SmarterEnergy is to link up customers and vendors and give the customers the information to make sure they are purchasing the equipment that meets their needs. In addition to providing the link to the vendors, SmarterEnergy also provides customers with Purchasing Guides to educate themselves about the purchase process. The Business Purchasing Guide contains equipment selection guides, technical articles, simple calculation tools, technology databases, links to other PG&E programs, and a supplier selection checklist. The structure is designed for three different types of user:

- *Users who want energy efficient equipment, but do not want to understand any details.* PG&E's technology databases are provided for those who simply want to bring a list of efficient equipment to their vendor and know that anything they order off that list is energy-efficient.
- *Users with little background in purchasing equipment who want to know the basics, but are not interested in the complexities.* Equipment Guides includes basic terminology and essential guidelines a consumer would need to know to be able to discuss options with a vendor.
- *Users interested in developing an in-depth understanding of building equipment.* In the Technical Articles section users can find short papers dealing with more detailed aspects of equipment purchase and maintenance and providing links to comprehensive reports and other technical information.

The Residential Purchasing Guide contains guidelines for customers seeking to purchase energy-efficient compact fluorescent fixtures and bulbs, refrigerators, washing machines, water heaters, furnaces, windows, and other household products. It is arranged similarly to the Business Guide, but has a more user-friendly, graphical layout oriented to residential users.

Conclusion

Each of the services discussed in this paper is designed to provide the missing links for customers wanting to implement energy projects. Different customers have different needs, but these

services have filled in the gaps for many customers who never got beyond the site survey point in the past. These services also reduce the emphasis on rebates and instead focus on helping customers see energy efficiency as a profit-enhancing opportunity and then overcome the design and informational barriers to realize the potential savings. These programs are part of PG&E's transition from DSM programs that concentrated on cost-effective resource acquisition and toward market transformation.

In the emerging competitive electricity market, it is unclear which institutions will assume responsibility for encouraging energy-efficient building improvements in the different market sectors. New players in the electricity market are attempting to bundle commodity and energy efficiency services because commodity alone has very tight margins. Most of these providers are offering only a limited range of services and targeting only large customers and chains. This leaves comprehensiveness of services and sectoral coverage to utilities or third parties that bid for administrative funds since market transformation is just starting in limited areas. Accomplishing market transformation in new sectors and technologies will require years more sustained effort. Although we have made progress, close to twenty-five years of energy efficiency progress still leaves much to be done.

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