Transforming Markets Through Education and Information
A Study of the Pacific Energy Center

John H. Reed, TecMRKT Works
Mary O'Drain, PG&E
Jim Chace, Building Science Resource Group

ABSTRACT

This paper describes an evaluation of the role of the Pacific Gas and Electric Company's Pacific Energy Center (PEC) in transforming the commercial building market to make it more energy efficient. The paper describes the role of energy centers and the PEC. The paper also briefly describes market structures within the commercial building market. The extent to which the PEC has reached its target audiences and the degree to which it has penetrated those audiences is also discussed. Finally, the paper discusses how the PEC has influenced market actors to change various behaviors and the extent to which actors say they will continue their new behaviors in the future.

Introduction

In recent years there has been renewed interest in information programs targeted to upstream building professionals who can influence the design of buildings and equipment. One form of information program is the energy center. There are currently several such energy centers operating in California, the Northwest and elsewhere in the country. A key question is how these centers may be influencing their target markets. This paper describes the results of research aimed at measuring the market transformation effects of one such center, the PG&E's Pacific Energy Center.

The Role of Energy Centers

Energy centers are organizations that have *physical locations* with missions to promote energy efficiency by educating selected target audiences about energy efficiency concepts, practices, and technologies through one-to-many and one-to-one interactions. Energy centers use multiple methods — classes, workshops, exhibits, consultations, tool lending, software development, meeting facilities, and Web pages — to communicate with their target audiences. The personal interactions with customers, use of multiple methods, and physical location are important defining features of energy centers that set them apart from other types of outreach or information programs.

Figure 1 is a simplified view of the operation of an energy center such as the Pacific Energy Center. The process starts with an assessment by a center of its target markets, the information needs of

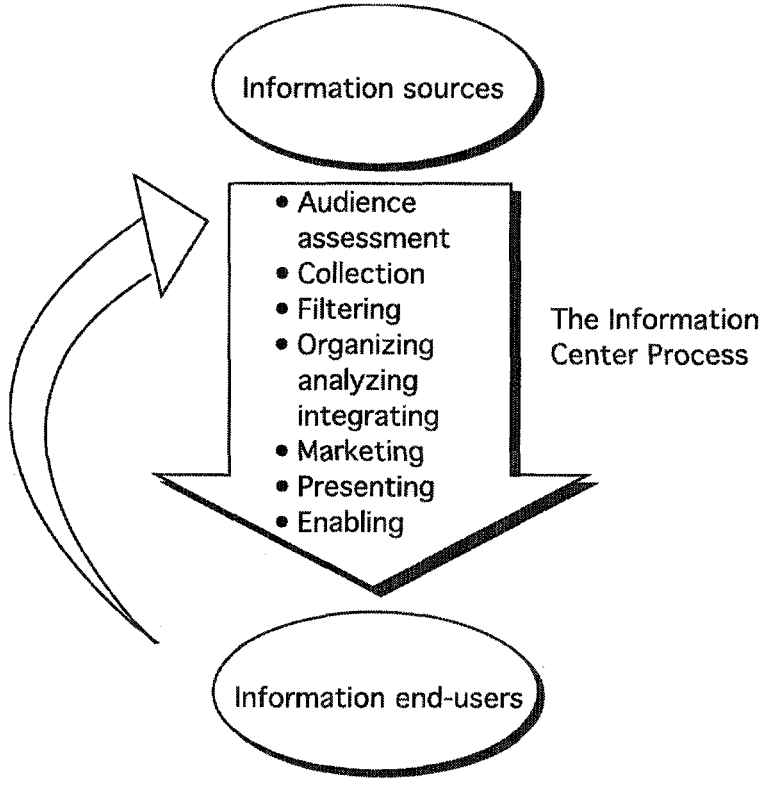


Figure 1 Generic Energy Center Model

those markets, and the media channels through which the markets may be reached. The process by which centers collect this data range along a continuum from the informal (e.g., observation and discussion with clients) to the formal (e.g., the use of focus groups and surveys).

Once an energy center has identified its market needs it begins to collect a variety of data and information related to those needs. In the case of energy efficiency, this includes theoretical information, information about efficient designs, methods of doing calculations, data about efficient products, and system operation. Energy center staff then filter, organize, analyze and integrate this information. These are important steps because it is this process which creates the added value for potential users. In essence, energy centers process the information, pick out the key bits of information, and assemble them into useful packages.

Energy centers have two products that they must sell: their own services and the information content they wish to convey. At a high level they must reach target audiences and make them aware of the services that they offer and convince users that they are a credible source that provides value. At a more basic level, they must generate awareness, acceptance and adoption of their message. This is a two-part process and both parts of the process are important. If centers fail to sell their services then their message will not be heard. Once they sell their services they must get users to adopt and implement their message.

A key step in the process is "enabling". Enabling is creating packages of information and tools that allow users to independently apply the information and concepts to their own problems in new and different situations. This involves the creation of databases, algorithms or computer tools, and methodological and application skills. In effect, enabling empowers the customer. Rather than constantly seeking advice the client is enabled to create his own solutions. The client can proceed until the client senses a need for new ideas, new products, or new designs.

Energy centers like the PEC create feedback loops that are informed by the ongoing process of audience assessment, data collection, and information dissemination.

Energy centers can do several things for clients. First, they can reduce the client's information search costs. Second, if their programs are effective, they increase the amount of relevant information that the client uses in decision making because the client uses his or her limited search time to focus on the most important information. Third, they provide a focused set of information that may lead to decisions that provide more efficient and comfortable buildings which provide value to the owners and users. In effect, energy center clients get more of the right information within their information search budget than other practitioners and may make more effective use of the information that they get than others.

The PEC

The PEC opened its doors in December 1991 at 851 Howard Street in downtown San Francisco. Since then, the PEC has recorded more than 30,000 visits for PEC related events. Because it is the PEC's philosophy to support professional organizations which share its interests by making available its facilities, large numbers of additional people have attended events hosted by other organizations at the PEC.

The PEC's primary targets are professionals and businesses associated with the commercial building sector — architects, engineers, designers, building owners, facilities managers, manufacturers, and distributors — who are located in the Pacific Gas & Electric (PG&E) service territory. In addition, the PEC has reached a large number of building related professionals in other segments of the commercial sector through referrals by other PG&E representatives, through secondary referrals by the primary clients, or through social and professional networks. The influence of the PEC extends well beyond the borders of the PG&E service territory. It has attracted literally thousands of professionals from across the United States and from around the world.

The goal of the PEC is to educate and train professionals in order to create a sustainable market for energy efficiency and energy efficient products. The PEC recognizes that in the long run, just "selling" energy efficient products may only minimally transform markets. Its educational philosophy is to promote a systems (whole building) approach that optimizes owner value, user comfort, and energy efficiency (Figure 2). PEC staff recognize that energy efficient practices and the use of energy efficient

products are more likely to be sustained when there are multiple reasons for adopting them. In this philosophy, *optimization* is the key. It recognizes that the maximum solution for energy efficiency may not always maximize owner value or customer comfort and may lead to the rejection of energy efficiency as a consideration in decision making. An optimal solution that includes energy efficiency allows decision-makers to achieve multiple goals and may lead to the wider adoption of energy efficiency practices. Fortuitously, energy efficient building solutions are usually consonant with owner value and user comfort.

The PEC conveys this message through a broad array of activities. A primary way is through workshops and classes. During the fall and winter of 1996 and 1997, the PEC presented more than 85 workshops and classes. Attendance typically ranged from 20 to 75 professionals. Workshops and classes address a wide variety of topics: solar geometry and its relation to the siting of buildings, windows and glazing; the use of architectural shading devices; lighting fundamentals; lighting design and daylighting; the use of daylighting controls and electric lighting; heating, ventilation and air conditioning (HVAC) systems design; building simulation models; building control systems and building communication networks to support controls; measurement tools and methods; and other topics. A key message running through all of the Center's activities is the interrelationship among these issues. The workshops and classes presented by the PEC usually include high quality student materials, demonstrations, frequent references to practical applications, case studies, and hands-on exercises designed to firmly implant course concepts in the minds of participants and provide practical experience.

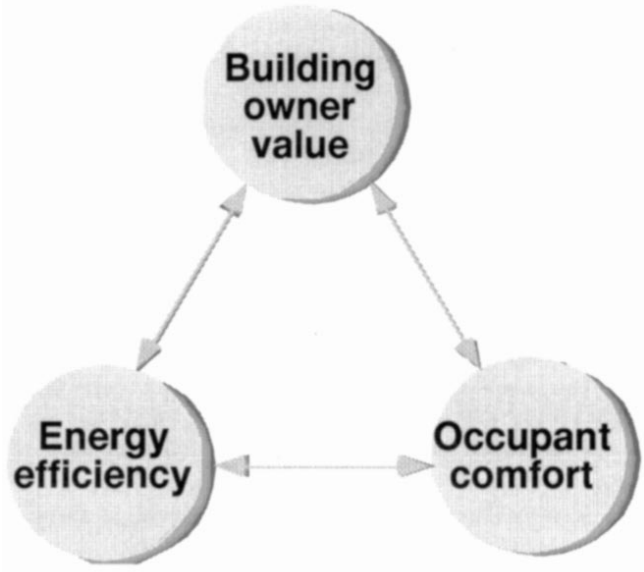


Figure 2. The core values in the PEC's educational philosophy

The PEC provides library services to its own staff and other PG&E staff as well as its targeted clients. The library contains professional reference materials related to core topics such as lighting, HVAC design, architecture, and others. It also has a fairly substantial selection of manufacturer catalogs and general trade publications as well as journals and magazines. There are a variety of materials available through electronic media and users have access to commercial search services and the Internet.

The PEC also has a variety of tools that it makes available to users. The lighting classroom can be configured to demonstrate how different lighting technologies may influence illumination, glare, and color in different settings. The heliodon allows a user to study sun and shadow effects using a scale model of a building on an adjustable table with a "sun" lamp. Users can also make use of daylight models to assess the effects of glazing, facade elements, and interior finishes on indoor environments. The PEC has full scale mock-up rooms in which the ceiling height, lighting, glazing, shading devices, and interior finishes can be changed.

The PEC has a service for lending measurement devices to record such things as lighting levels, occupancy, temperature, power consumption, and meteorological data such as wind speed. The PEC helps clients to understand where and how to install these devices, how to design experiments to get desired results, and how to analyze data from the equipment.

In addition to the above, the staff frequently provide one-to-one consultation services which range from answering specific questions regarding technologies on the telephone to on-site sessions at the PEC involving the development of full blown client specific demonstrations.

The PEC facility is housed in a 32,000 square foot building that is itself a technology demonstration. The building, which was renovated especially for the Center, incorporates a variety of shading and light transmitting technologies. It has a near state-of-the-art HVAC system with a whole building control system. There is an area set aside near the entrance of the building to demonstrate energy efficiency prin-

ciples and applications for the residential sector. The lighting classroom contains a variety of displays as well as a broad array of lighting technologies that can be individually controlled for purposes of demonstration. There are very substantial displays of lamps, glazing, control systems, HVAC systems, and other items throughout the facility. There are several other rooms that serve as classrooms and meeting facilities. The ambiance and the quality of the displays and facilities communicate a message of quality and professionalism.

Overview of the Research and Research Methods

The PEC is much admired and the anecdotal evidence and testimony of users suggest that the PEC has been fairly effective. However, until recently there had never been a study that formally addressed the issue of the impact of the PEC's programmatic initiatives on its target audiences. PG&E initiated this study to provide that kind of information in the summer of 1997. Fundamentally the research was designed to address two issues:

- Have the programmatic initiatives of the PEC succeeded in transforming the building design and construction practices in the commercial buildings sector so that buildings are becoming more energy efficient?
- What lessons can be learned about measuring market transformation programs from studying the market transforming effects of the PEC?

More specifically the study addressed the following questions:

1. What are the key market structures in commercial building products and services markets?
2. To what extent is the PEC reaching these markets?
3. When the PEC has reached these markets, has it been able to effectively communicate its message to actors in ways that induce changes in behavior?
4. What are the most important factors that influence market actors to change their behaviors?
5. If market actors have changed their behaviors in response to the PEC, what have the impacts been?
6. Will the changes in behavior and the impacts associated with the behaviors continue in the future?

The research methodology involved four main activities. The first was the analysis of participation data maintained by the PEC to understand the amount, timing and levels of participation. The second was the linking of company information in the PEC participation database with Dun and Bradstreet data to assess the relative levels of penetration of the PEC into its target markets. The third set of research activities involved in-depth interviews with more than 40 professionals in the professional communities associated with commercial buildings including PEC staff, architects, engineers, lighting designers, building owners and building operators. The primary purpose of these interviews was to gather data with which to describe markets and to gain a qualitative understanding of market impacts. The final major research activity was the completion of a 25 minute survey with 216 users of PEC services. This survey covered a range of topics including levels of participation in various PEC offerings, changes in behavior in response to participation, factors that influence decision making, and use of information from the PEC in actual projects. The survey data are the primary source of data about PEC impacts.

Market Structures Are Very Diverse

We often speak of the commercial buildings market as if it is some sort of monolithic / homogeneous market. In fact the market is extraordinarily diverse as this study shows. For example, in some parts of the market architects play key decision making roles in the design and construction of the buildings. In other parts of the market, architects have less control and mainly provide services leading to the design of the shell and the aesthetics of rectangular boxes while operating as one of several subcontrac-

tors to a more general contractor. A key problem in assessing the market effects of an institution such as the PEC is to understand the market structures that the PEC is trying to influence and to examine the extent to which the PEC is influencing various submarkets.

Figure 3 provides an overview of the commercial buildings market showing the new construction market and the existing buildings market. Within the new construction market there are corporate owners, commercial property developers and large commercial real estate firms which develop and lease property. Corporate owners may have some in-house staff but many are now relying on commercial property developers to develop properties for them. These groups may use a traditional architectural approach, a design build approach or a collaborative process approach to build new buildings.

In the traditional architectural model (Figure 4), key decisions are likely to be driven and controlled by architects and designers. The key to more efficient design is acceptance of the architect's design by the owner, the knowledge and skills of the design team with respect to efficient design, and the degree of integration and collaboration among members of the design team. The latter issue is particularly important in obtaining a quality building and is largely an organizational and communication issue rather than a technical design issue.

In the design build model (Figure 5), the goal is to construct the building quickly. Design and construction are usually on parallel tracks. Success in applying the design build approach relies heavily on the contractor's experience and knowledge and the knowledge and experience of firms hired to support the contractor. Architects, designers, planners, and engineering firms are hired to deal with their respective parts of the building. The amount of integration among the disciplines is sometimes minimal. In this regime, lighting design is likely to be done late in the process and not likely to have much affect on the basic physical design of the building, its façade, windows and glazing unless there is a thermal heating problem from too much or the wrong kind of glazing. If the building is built for speculative purposes, the contractor largely determines the efficiency characteristics of the building. If it is built to customer specifications, then the customer's design staff (if the customer has one) may have a significant influence with respect to the efficiency of the design.

Similarly, Figure 3 illustrates a variety of ways in which the energy use in existing buildings may be managed. For example, very large commercial property owners typically have planning and design staffs. The individual buildings belonging to these owners have professional building engineering staff. Messages about the technical approaches to energy efficiency are best addressed to the planning and design staff and to the building engineering staff who influence technical decisions. The concerns of very senior managers in property owning firms are with investment decisions and there is often little interest in the technical details of energy efficiency. Messages about efficiency from institutions such as the PEC to senior managers are best couched in investment language.

Now, the key point is that the decision-makers and the values driving decision-makers are quite different. For the traditional model, influencing the decision making of architects and designers is most important. Influencing contractors and owners' in house property management staff is the key to achieving change in the design build model. For large property owners, the in-house design staff and the building engineers are probably the key to change. An institution such as the PEC is most likely to transform the market when it influences these key players.

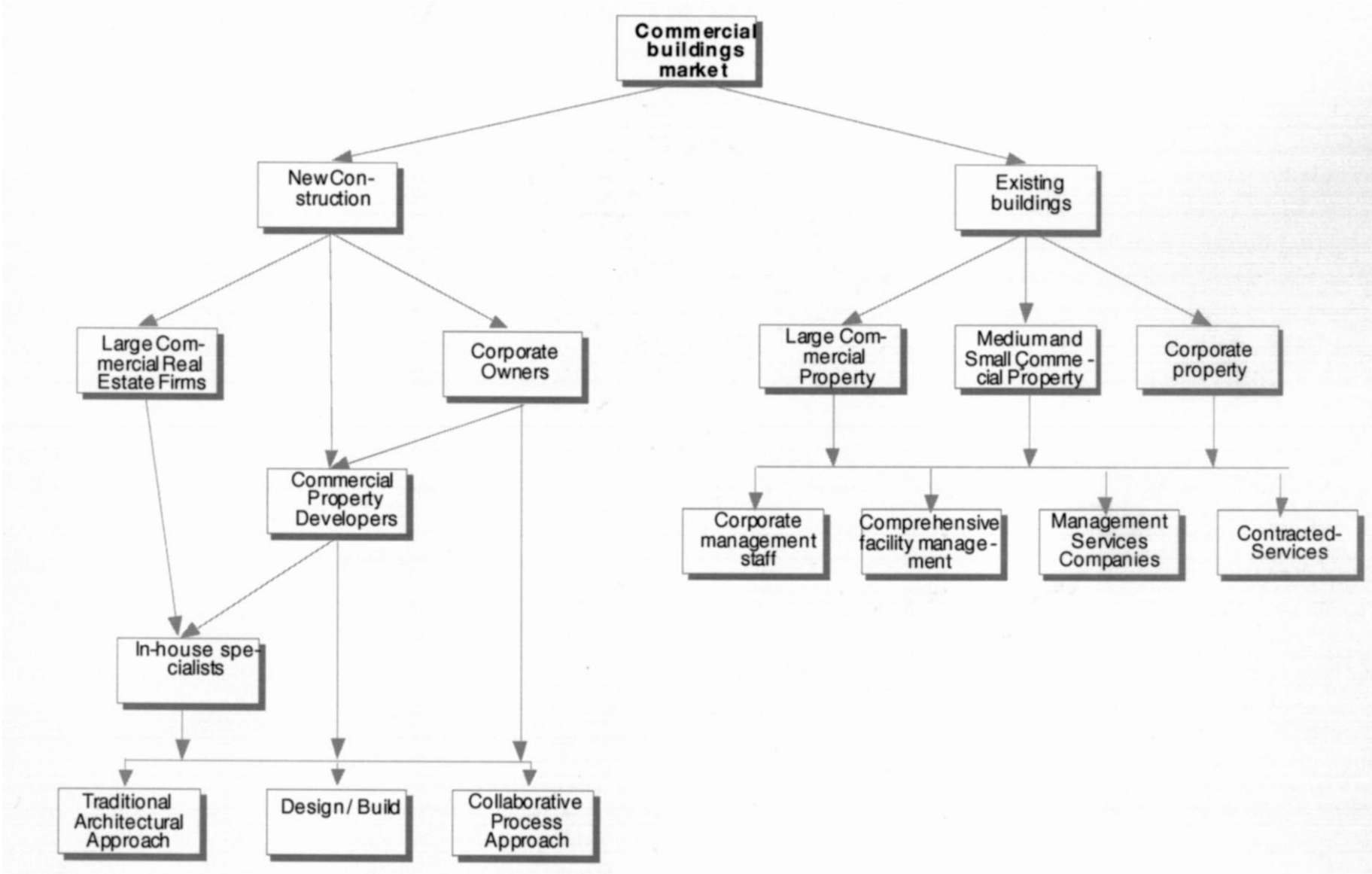
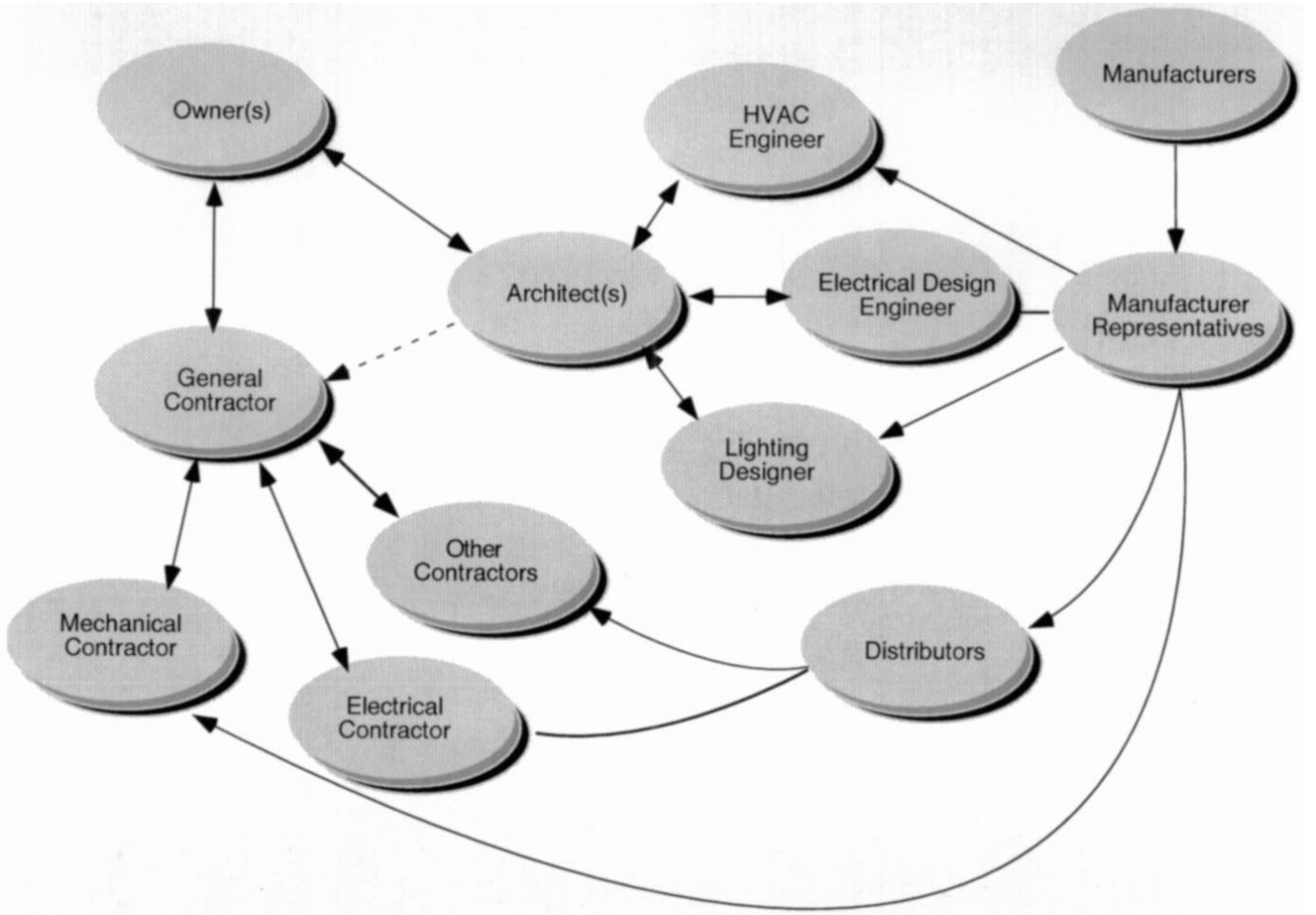


Figure 3. Overview of commercial building markets



Source: TecMRKT Works. 1997

Figure 4. General structure and relationship among actors in a traditional building construction activity

The PEC has reached its target audiences

One indicator of success in transforming markets is whether an institution such as the PEC is reaching its target markets. In this study, the strategy for determining if the PEC reached its markets was two fold. The first was to determine the relative size of markets and then to determine the penetration of the markets. We found that it was very difficult to develop reliable estimates of the size and penetration of target audiences because there were significant problems with estimating the sizes of the audiences.

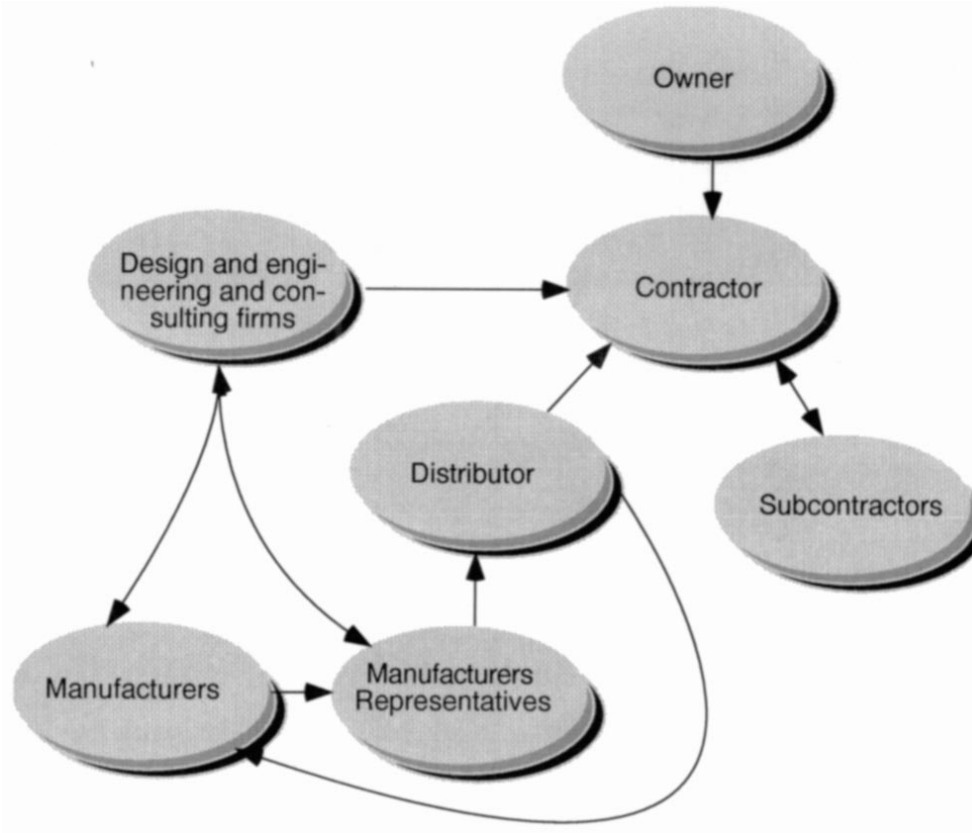
There are at least three problems. The first is that it is very difficult to obtain good lists of market players. Membership lists for professional societies are often not available to nonmembers of societies even for research purposes. Further, such lists may contain the names of as few as a sixth to a quarter of the professionals working in a field.

We also found that lists could be too inclusive and not inclusive enough at the same time. For instance, there are approximately 21,500 architects licensed to practice in California. As many as a third of these may reside in other states. In a given year we estimate that there are approximately 8,000 commercial building projects in California which are completed by about 2,000 firms. Many of these firms employ persons who are trained as architects but who are not licensed. The ratio of technical workers to

architects in such firms may be as high as 7 to 1. Thus, a substantial number of design personnel may not be on any list. Further, architects active in commercial projects are a small fraction of all architects.

Finally, an organization like the PEC may attract professionals from a broad spectrum of disciplines, for example, interior designers, retail display specialists, theatrical lighting designers and many others. It is very difficult to establish the size of such target audiences. Users wishing to explore the relevant methodological issues should see Reed and Hall 1998.

Table 1 shows estimates of penetration for selected market segments based on linking of attendance at PEC events and Dun and Bradstreet data. The value of the Dun and Bradstreet data is that they are reasonably comprehensive and allow us to obtain to obtain the characteristrics of firms. These data indicate that the PEC has reached 30 percent to 40 percent of engineering services companies, lighting designers and lighting equipment vendors. Based on data from other sources, we know that the PEC has reached about 40 percent of large property owners. We were unable to determine the degree of penetration of the architectural community largely because of the aforementioned problems in establishing a reliable estimate of the number of firms in the PEC's market shed. However, architects are among the most numerous users of the PEC and we believe that the penetration of this group is substantial.



Source: TecMRKT Works, 1997

Figure 5. Design / build model

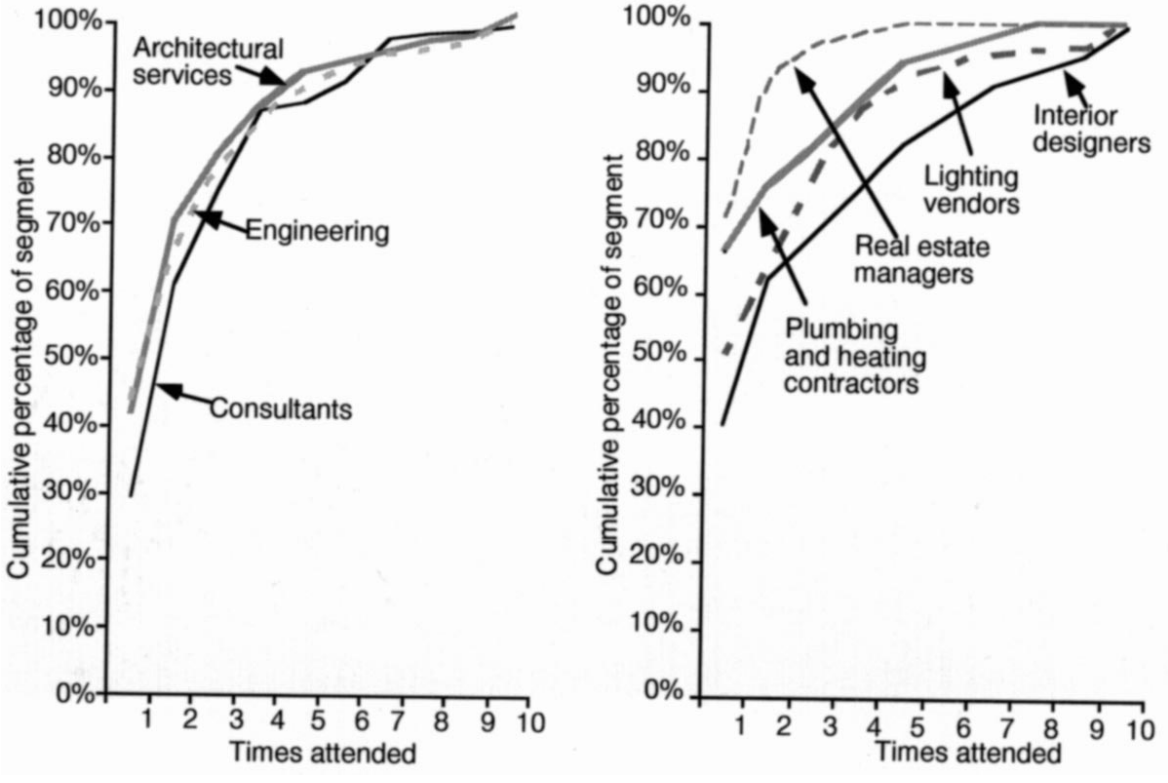
Table 1. The size of market segments and the penetration of those segments by the PEC

Category	Number of firms in PEC and D&B data bases	Number of firms D&B estimates are in Northern California	Estimate of penetration (percent)
Engineering services companies	259	828	31
Interior designers (lighting)	182	437	42
Lighting equipment vendors	75	196	38

Penetration rates of 30 percent and 40 percent have practical and theoretical significance. Rogers and Moore as well as many others have pointed out that people adopt concepts and innovations at very different rates and that people and organizations can be placed in one of five stages of adoption: innovators, early adopters, the early majority, the late majority and the laggards. The long term acceptance of new technologies and techniques in the market place is not guaranteed until the technology and ideas begin to be adopted by the early majority. We know from numerous other studies that inno-

vators and early adopters usually represent about 16 percent of the market. Thus, the 30 to 40 percent penetration rates that have been achieved by the PEC suggest that the PEC is reaching beyond early adopters and innovators and gaining broader acceptance.

The PEC's message has a broad based content that is sophisticated and complex. It is a message that is most likely to be received and utilized after repeated contact and reinforcement. Thus, a key measure of the PEC's market reach is whether it is generating repeated contact between users, the PEC and its staff. Figure 6 shows cumulative distributions of contact between the persons classified as being in architectural services, engineering, consultants, and other professions and the PEC. The flatter and lower the curve the more often individuals have attended the PEC. The majority of PEC users in its key market segments, architects, lighting designers, and engineers, have used the PEC multiple times. Roughly ten percent of users from these segments have five or more recorded uses of PEC services. These data show that the PEC is making significant contact with its users. The fact the users are returning also demonstrates that users are finding value in PEC services.



Note: Data presented in two graphs for greater visual clarity.

Source: PEC participation data and D&B data

Figure 6. Attendance by professional affiliation

The PEC Is Influencing Behavior

A key question is whether the PEC's services can be associated with significant changes in relevant market related behaviors. In order to test this, we identified a series of behaviors which building professionals might exhibit if they understood and implemented the concepts and technologies being promoted by the PEC. In the survey, we asked participants if they had engaged in more or less of these behaviors since their participation in PEC activities. If the participants indicated that they had changed their behaviors we then asked if their PEC participation was partially, wholly, or not at all a factor in their changing behavior.

Table 2 provides information about changes in selected behaviors for three professional design disciplines, lighting design, HVAC design, and architecture. Nearly 80 percent of those engaged in lighting design said that they were specifying more efficient equipment while 20 percent said that they were using more computer tools since before they had used PEC services. About half of those engaged with HVAC design said that they were paying more attention to the interaction between HVAC systems and other building systems and just under 20 percent said that they had changed their practices and were using load frequency distributions to determine the number and size of components. About 70 percent of those engaged in architectural design said that they were having more discussion with clients about the shell and façade and about a quarter said that they were introducing integrated controls. Thus, it is clear that behaviors changed after using PEC services but also that there are variations in the amount of change according to the behavior. (For a fuller discussion of the range of behaviors see Reed, 1999.) The question is, was the PEC a factor in promoting changes in behavior.

Table 2. Percent indicating change in selected behaviors since before utilizing the services of the PEC

Behavior	Less	About the same	More	DKNA	N
Lighting design behaviors					
Specification and use of more efficient lamps, ballasts, and reflectors		20	79	1	107
Use of computerized tools to evaluate lighting performance and equipment efficiency options	4	70	21	6	107
HVAC design behaviors					
Attention to the interactions between the HVAC system and other building systems and components in the design phase	3	47	49	1	72
Use of expected load frequency distributions to determine the number and size of components such as chillers		76	18	6	72
Architectural design					
Amount of discussion with clients about the interactions among different building systems such as building orientation, shell construction, shading devices, windows and glazing, mechanical systems and lighting		31	69		
Use of integrated controls to integrate systems		69	26	6	

Table 3 displays information about the degree to which respondents attributed changes to the PEC. The sum of the percentages in this table should add to the percentage approximating the percentage of those in Table 2 who indicated that they have changed their behavior. There are some slight differences in percentages due to rounding issues. In Table 2 we see that the 79 percent of respondents who said they were specifying more efficient equipment are made up of 35 percent who say the PEC was a partial factor in their behavior change and 44 percent who say that the PEC was a main factor.

Based on the broader data in the full study and the data presented here, we conclude that the PEC was nearly always a partial factor in professionals adjusting their behaviors. For some behaviors, a majority of respondents attributed changes in their behavior mainly to the PEC.

Although we do not show the data in this paper, respondents who were heliodon users, who were measurement tool borrowers, or who participated in building simulation workshops also indicated

that they had changed behaviors as a result of their PEC related experiences. Across the various disciplines, the study found that lighting designers indicated they had changed their behaviors the most.

Table 3. Percent indicating PEC was a motivator for their change in behavior

Behavior	Not a factor	Partial factor	Main factor	DKNA
Lighting design behaviors				
Specification and use of more efficient lamps, ballasts, and reflectors		35	44	1
Use of computerized tools to evaluate lighting performance and equipment efficiency options	6	11	7	
HVAC design behaviors				
Attention to the interactions between the HVAC system and other building systems and components in the design phase	7	33	11	
Use of expected load frequency distributions to determine the number and size of components such as chillers	1	15	1	
Architectural design				
Amount of discussion with clients about the interactions among different building systems such as building orientation, shell construction, shading devices, windows and glazing, mechanical systems and lighting		37	31	
Use of integrated controls to integrate systems		12	14	

There are many factors in the environment that represent both barriers and incentives for PEC users to adopt new technologies and techniques. One aspect of this study was to assess the importance of various factors, such as reliability, cost, information from the PEC, and other types of information used in decision making. Table 4 highlights the relative importance of a few selected decision factors.

Among factors influencing decision making, reliability was ranked the highest, followed by cost factors, followed by demonstrations, and then information from sources such as the PEC. Printed case studies were among the least important factors.

Perhaps the most important finding in our analysis of decision factors is that people have different decision styles and these styles affect the information that people seek and use. In the report we completed a factor analysis of the decision data. We found that there are the "globally attentive" who consider a broad range of factors and weigh information most heavily. There are the "client oriented creatures of habit" who follow client dictates and rely on specifications and manufacturer catalogs. There are the "systems oriented investors" who focus mainly on the investment potential and who respond to rebates. Finally, there are those for whom first cost is the only issue. In some subsequent work for the Northwest Energy Efficiency Alliance (Reed, 1999) we have found similar factors.

It is clear that the PEC and organizations like the PEC will have the most impact on respondents who score highest on the first factor and less impact with the others. If the PEC staff targets end users, they may influence the second group. If PEC like organizations properly frame their messages, they can reach the third group. They may have to wait until the market is transformed to reach the fourth group.

Table 4. Percent indicating the importance of the factor in decision making

Decision factor	Importance					
	Not at all important	2	3	4	Very important	DK/NA
The reliability of product or design	2	1	12	32	50	3
First cost	4	0	17	27	49	3
Operating costs	2	6	22	33	34	2
A demonstration or test conducted by you	16	7	17	25	29	5
Information from the PEC	7	11	33	34	12	3
Advice from colleagues	5	9	36	32	15	3
Specifications from previous projects	8	11	35	24	19	3
Professional publications	6	16	34	31	11	2
Information from other professional workshops	9	11	42	26	9	3
Printed case studies	18	17	31	25	7	3

Source: participant survey; n=216

Users Will Continue to Use Behaviors Learned as a Result of Exposure to the PEC

One of the key issues in the market transformation is whether changes induced by market transformation programs persist in the long term. Figure 5shows the responses of PEC users to a question about whether they will continue behaviors learned at the PEC in the future.

Approximately half of the respondents said that once they had changed their behaviors, they continued to engage in all or nearly all of the new behaviors. Another quarter said that they had continued most of the new behaviors. These findings imply that behavioral changes induced through PEC activities will continue in the future.

Table 5. Likelihood of continuing behaviors changed as a result of participation in PEC activities

	Percent (n=198)
Discontinue almost all changes	1
Continue only some of the changes	19
Continue nearly all of the changes	26
Continue all of the changes	54
Total	100

Source: participant survey

Changed Behaviors Are Influencing Many Buildings

There is also evidence that the behavioral changes wrought by the PEC's activities are resulting in the implementation of new technologies and techniques in commercial structures (See Table 5). Over 40 percent of the respondents who said that they had changed their behaviors said that the new behaviors and changes in behavior were influencing most of the buildings with which they were dealing.

Summary and Conclusions

This paper summarizes a larger study of efforts to transform energy use in the commercial buildings market. There are several important results of the study.

First, the study points to the heterogeneity of the commercial buildings market. Market transformation efforts must take into account the different segments — new construction, existing buildings, traditional architecture, design build — in the market by targeting the appropriate audiences with information that is most relevant to their patterns of decision making.

In order to effect market transformation, several steps are required. The target market must be reached. The audience must receive the message. The audience must adopt the message. The audience must implement what they have adopted. The audience must continue to engage in behaviors in the future.

In this evaluation we examined whether the PEC was accomplishing each of these steps. We concluded that:

- The PEC is reaching its intended audience.
- Its message is resulting in behavioral change.
- The behavioral changes are leading to changes in commercial buildings.
- There are clear differences in the factors that people take into account in their decision making
- People indicate that they will continue the changes.

Table 6. Number of buildings influenced now and in the next two years

Number of buildings	Buildings influenced since participation Percent n=173	Buildings influenced in the next two years Percent n=160
1	9	8
2-5	38	32
6-10	20	17
11-15	8	8
16-20	3	4
21+	23	32
Total	101[a]	101[a]

[a] total exceeds 100 due to rounding

Source: participant survey

Finally, the report and the paper demonstrate an important methodology for the study of market transformation. The study uses behavioral measures and attempts to understand how the behaviors have changed over time and whether the changes in behavior are attributable to the PEC. Focusing on the specific behaviors is essential if one is to understand how these markets are being transformed. In this study we were limited to a cross-sectional study design because of resources issues. In future studies, we need to ask the same behavioral questions at different points in time and track participation in PEC activities and other types of influences. If we do this we should be able to link the different factors influencing professionals in a cause and effect relationship.

References

Eto, J., R. Prahl, and J. Schlegel, *A Scoping Study on Energy Efficiency Market Transformation by California Utility DSM Programs*. Berkeley: Ernest Orlando Lawrence Berkeley National Laboratory, 1996b.

Moore, G. *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers*. New York: HarperBusiness, 1991.

Rogers, E. *Diffusion of Innovations*. 4th ed. New York: Free Press, 1995.

Reed, J. H. and N. P. Hall, *PG&E Energy Center Market Effects Study*, (San Francisco: PG&E, 1998).

Reed, J. H. and N. P. Hall, *Lighting Design Lab Market Progress Evaluation*, (Portland: NEEA, 1999).

Schlegel, J., and F. Gordon, "Using Performance Incentives to Encourage Distribution Utility Support of Market Transformation Initiatives," in the *Proceedings of the ACEEE Summer Study*, 7: 167-77, 1996.