New Commercial Office Building Markets: Strategies for Improving Building Energy Efficiency

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ABSTRACT

What factors shape the form of commercial office buildings? The answer to this question is important for understanding how to encourage higher levels of energy efficiency in commercial buildings. In this paper we consider this question using results from a recently completed research project that aimed to improve our understanding of new commercial office building markets. The research included depth interviews with industry actors in four large markets in the Pacific Northwest and California and a series of case studies of particular building development projects. The results of our research offer important insights on the new commercial office building market, the key players involved in the market, the motivations behind building development, and the key elements for successful building projects. These market concepts expand our understanding of new commercial building markets and they provide the theory for developing strategic interventions in these markets to encourage energy efficiency. We apply our research results to develop market strategies that can be used by programs that aim to produce higher levels of energy efficiency in new commercial building markets. Our findings and proposed strategies, along with related research conducted by others, provide an important foundation for the development of the next generation of new commercial building energy efficiency programs.

Introduction

Several decades of new commercial building energy efficiency programs have produced some gains in the energy efficiency of new commercial buildings (Johnson and Nadel 2000). Building standards and codes have improved and a variety of more energy efficient technologies have been introduced into the marketplace and incorporated into the designs of new buildings. However the gains that have been achieved are much less than the 30 to 50 percent improvement in building efficiency that many energy efficiency advocates believe is possible (DOE 2000).

Why haven't commercial building markets embraced higher levels of energy efficiency? Recently completed research (Lutzenhiser et. al. 2001; Kunkle & Lutzenhiser 2001) supported by the California Institute for Energy Efficiency and the Northwest Energy Efficiency Alliance (Alliance) considers this question. The overall purpose of this research is to increase the understanding of new commercial office building markets to support better-informed strategies to encourage energy efficiency in those markets.

In the initial part of this paper we review the key findings from our research and develop the market theory that supports our proposed market strategies. We then present a set of market transformation strategies and conclude with recommendations for next steps.

Research Findings

To develop a better understanding of the new commercial office building market, our research used the following research techniques and data sources: (1) findings from an extensive literature review including published work in the social sciences, architecture, urban planning, real estate development, and construction management; (2) documentary source materials such as articles in the business and trade press and local newspapers; (3) observation and interaction with market actors at conferences and trade shows; and (4) in-depth ethnographic interviews with key industry informants.

The in-depth interviews were the central element of our research. We conducted interviews with 95 members of the building development industry (Table 1). These individuals generally were employed by larger national and regional firms such as Spieker Properties (now part of Equity Office Properties), Hines, Wright Runstad & Company, Colliers International, NBBJ Architects, Baugh Construction, and Bank of America. The in-depth interviews generally lasted from 30 to 60 minutes and most were conducted in-person. The interviews were designed so the participants had the opportunity to describe the market, their work, and the factors that influence building development. We identified a half dozen specific building projects and made observations and conducted interviews with participants in those projects to better understand the development process. To allow us to gain a more in-depth understanding of a particular commercial building market segment, we focused our research on new commercial office building markets – the largest commercial building segment. Our research was centered in four regional markets: Sacramento, San Francisco, Seattle (Puget Sound), and Portland.

Table 1. Building Industry Participants in the In-Depth Interviews

Type of Building Industry Participant	Number of Participants
Financiers/Investors	7
Developers/Owners	24
Designers (Engineers and Architects)	16
Contractors	11
Regulators/Government Organizations	8
Real Estate Industry Members (Brokers, Managers, Analysts)	12
Energy Efficiency/Sustainability Consultants and Service Providers	17
Total	95

In this review of our research findings, we introduce some key market concepts, describe how innovation and change occurs in the market, identify complimentary interests and trends that offer opportunities for supporting energy efficiency, and develop our theory for market change.

Market Concepts

When considering the potential for market transformation in commercial building markets, it is important to understand the context for energy efficiency in these markets. This affects both the relevance and perceived value of energy efficiency in the market place.

Commercial building markets are complex. Within each local market, a variety of market actors come together to produce new commercial buildings using a development process that has evolved over time in response to market circumstances. A variety of factors shape and constrain the development process and the form of the buildings produced. We would like to highlight four key market concepts that help establish the context for energy efficiency in these markets: (1) broad macro influences, (2) the nature of buildings as investments, (3) the players involved in building development, and (4) the three factors necessary for successful building development.

Macro influences. The office building development and construction industry is continually influenced by such things as the political climate, urban conditions, social/cultural characteristics, environmental issues, and the economy. These macro influences are difficult to predict and control and they profoundly affect building markets – how, when, and where development occurs. In particular, building markets are driven by business activity and the creation of jobs. As a result, the office building industry goes through boom and bust cycles. Building booms occur in response to growing demand for office space in the face of limited supply. Low vacancy rates and rising rents support investment in new construction by promising strong economic returns to investors. A bust phase occurs when supply outstrips demand and building vacancy rates increase. This causes rent levels to decline, restricting investment in new buildings. All four markets we investigated have recently gone through this cycle, experiencing low vacancy rates and a fair amount of development corresponding to the strong economy (particularly in the high tech sector) through 2000. The fallout in the high tech industry in 2001 resulted in a significant decrease in the demand for office space, leading to high vacancy rates and little development.

Buildings are investments. The nature of buildings as investments fundamentally defines and structures the development process and building industry motivations. Those in the real estate development industry make money by correctly judging the market, its needs, and requirements and delivering buildings that produce reliable income streams to investors to justify their capital investments. Building development is inherently risky due to a variety of uncontrollable market variables (economic cycles, capital costs, regulations, etc.). Building developers use 'models' that have worked well in the past to control risk and ensure delivery of successful building projects.

Market players. The building development "industry" is in fact a series of linked industries that include a number of market actors that come together to influence and deliver a building product. Our research defined six major industry groups involved in the development process – providers of capital, developers, design and delivery professionals, community/ political/regulatory interests, real estate service providers, and users. Each group of market actors plays a role in shaping the nature of building development. For the most part "upstream" actors constrain the choices and actions of "downstream" actors. In general,

decisions made by developers and providers of capital (with input from other market actors) about budgets, location, revenues, target markets, and so forth shape the *form* of the building and constrain the options of design and delivery professionals concerning building *content*—what designs and technologies will be implemented and what services will be rendered.

Three factors. Successful real estate development requires three things – *users, capital, and land (building site)*. What is ultimately built is shaped by the availability of each element and the requirements and constraints they impose. A building developer must balance and respond to the interests of providers of capital, to community/political/regulatory requirements about land use for a building site (represented through zoning, building codes, and review processes), and to the requirements and needs of building users.

The Nature of Change in Commercial Building Markets

The nature of building development constrains innovation. The models used by the building industry to control risk work against trying new ideas. This can limit the introduction of new approaches to improve building energy efficiency. Yet buildings do change in response to new market requirements and market uncertainty. These incremental improvements actually "lift the standard" for the sorts of buildings that markets expect and suppliers produce. We identified three factors in our research that stimulate innovation in commercial buildings:

- The *owner or occupant* of a building project can introduce specific needs or requirements that dictate a non-standard response from the building development team. Special owner or occupant requirements can be products of a particular *vision* for the building, and/or from specific *functional needs* for the space.
- Broader *market influences and requirements*, as well as beliefs about trends and perceptions of changing client demands, can lead to *anticipatory innovation* from the development community. Effectively responding to broader market developments is crucial to developing properties that will maintain their value.
- *Local conditions and requirements* including land use requirements, building codes, community needs, site circumstances, political realities, and cultural climates all have a significant influence on how land can be used and what can be built on a particular piece of property. New requirements or challenges for a particular site can lead to innovation from the development community.

Complimentary Interests and Trends

Most industry innovations may have little to do with energy efficiency, and some may work counter to it[1]. For energy efficiency innovations to occur, they must reduce the risk associated with market uncertainty. In our research, we found three prevalent building industry views about energy efficiency: (1) that the energy code represents energy efficiency, (2) that "we (the building industry) already do energy efficiency" by incorporating energy

[1] For example, the introduction of mechanical air conditioning systems had a profound influence on building design and energy use. Clearly this innovation provided great value to the marketplace, but some efficient design practices were lost.

efficient technologies into buildings, and (3) that "we have been burned by energy efficiency." Each of these views limits the ability to achieve higher levels of building energy efficiency because energy efficiency is not seen as a relevant mechanism to respond to market requirements or market uncertainty.

For energy efficiency to diffuse in the market place, our research suggests that it must: (1) be embedded in complementary interests in the building industry, (2) provide value by responding to market requirements, while (3) also reducing uncertainty. In the course of our research, we identified the following six market trends and building industry movements that are relevant to energy efficiency. These 'complimentary interests' provide potential opportunities for energy efficiency to add value and reduce market uncertainty.

- The movement toward more *green and sustainable* buildings. While green building is clearly a niche market, our research found that key players in the Puget Sound and Portland markets are embracing or claiming to embrace green building practices. Energy efficiency is one important element of green building practice.
- The growing interest in providing *quality work environments* as a way to attract and retain employees. This includes such things as indoor air quality, occupant comfort, and worker productivity. This potentially supports the application of building systems and components that also offer energy efficiency.
- The application of *new building technology and controls* to improve building performance. This interest in "smart buildings" can lead to building systems that are more energy efficient.
- *Development process innovations* offer the possibility of improving the production process by eliminating fragmented knowledge and authority, information gaps, and poor communication and coordination that lead to sub-optimal design and delivery. These innovations include increased supply chain integration, web-based information management tools, and building commissioning. This provides the potential for more effectively addressing energy efficiency in the development process.
- The use of *regulation* to shape building development. While energy codes have been a traditional regulatory mechanism, our findings suggest that other regulatory mechanisms that offer incentives to developers for meeting community goals may provide an opportunity for higher levels of building energy efficiency.
- *Energy price volatility and system reliability* are significant concerns for the building industry. This heightens interest in energy and provides an opportunity for energy efficiency to reduce the risk associated with energy prices and reliability.

A Theory for Market Change

The market concepts and complimentary interests that we have considered provide a basis for developing a theory for market change. Effective market transformation efforts need to address energy efficiency in the marketplace on multiple levels, in concert with the efforts of multiple market and non-market allies. It is not enough to simply introduce new energy-efficient technologies into the market place. The mechanisms for incorporating energy efficiency into buildings must change, taking account of the market concepts we have identified. We propose three elements for creating market change.

- *Making energy efficiency relevant* by linking market transformation efforts to complementary building industry trends and interests, with the idea of making energy efficiency more visible as a tool for meeting industry goals.
- *Encouraging demand and institutionalizing energy efficiency in the market place* by creating an impetus for change in the market that leads to demands by owners, occupants, and investors for more efficient buildings. Efforts to create demand must be targeted to specific market actors. This requires more than the sharing of information, but must involve and engage market actors to create a willingness to act and to produce practices that institutionalize the demand for energy efficiency in the marketplace.
- *Standardization within the development and design process.* Tendencies in the building industry to standardize and make things routine must be taken advantage of, rather than focusing on trying to get the industry to accept non-standard or innovative ideas. New ideas need to fit within existing development models as much as possible.

These three elements are intended to minimize the risk to the building industry associated with market change by linking with trends that already have value, by developing user demand, and by utilizing building industry models and standards. This theory for market change guides the development of the strategies presented in the next section.

Potential Market Transformation Strategies

Based on our research and the market theory we have developed, we propose some strategies for transforming commercial building markets to higher levels of energy efficiency. These strategies and the logic behind them provide a basis or starting point for developing the program theory for a commercial building market transformation program. We present our strategy ideas in terms of the complimentary market trends noted above. We identify market actors and mechanisms that can be used to achieve higher levels of energy efficiency in the building market. This approach flows from our theory of market change and aims to reduce the perceived market risk and uncertainty associated with pursuing energy efficiency. We have added an "overall coordination strategy" element to the set of complimentary trends to take advantage of the potential for synergistic effects.

For each strategy area (complimentary trend), we provide a brief market transformation story and a table that identifies key market actors, existing activities, and mechanisms for each area. The market transformation story describes how we believe the proposed strategy area could lead to market change that supports higher levels of energy efficiency. The key market actors correspond to the building industry groups we identified in our research and represent actors that can have significant influence and play a role in delivering the proposed strategy. Existing activities represent complimentary activities that we identified in our research that support the achievement of the proposed strategy. The mechanisms represent tools used by the marketplace to create change and institutionalize practice. While most of the proposed mechanisms are well-known efficiency program approaches, the intent is to redirect these efforts on multiple levels to engage market actors and integrate energy efficiency into the mechanisms the building market is already using.

Note that marketing is a common mechanism for many of the strategy areas. We are not suggesting broad marketing and awareness type activities, but rather targeted marketing

efforts intended to communicate specific messages to specific groups in order to support efforts to institutionalize the supply and demand of energy efficient buildings. We envision these marketing efforts focusing on developing relationships and networks with the industry.

Green Buildings

There is an opportunity to leverage interest in green buildings to support development of better buildings that are energy efficient (Table 2). Energy efficiency is a key ingredient in the delivery of successful green building projects and can be institutionalized within green building guidelines and regulations. Existing green building guidelines and standards should be reviewed and energy efficiency requirements and recommendations strengthened. Marketing efforts need to target institutional users and investors and the build-to-suit market niche to promote the value of green buildings and the relevance of energy efficiency in the delivery of successful green building projects.

Table 2. Characteristics of the Green Building Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms
–Institutional Users –Progressive Regulators –Institutional Investors	–LEED[2] –Earth Advantage –Public Sector Efforts in Portland, Seattle, and Other Cities –Energy Tax Credits –Natural Step	–Targeted Marketing –Guidelines –Regulations –Design Assistance –Capital Incentives

Work Environment

There is an opportunity to work with building user groups to develop and define how energy efficiency supports a quality work environment (Table 3). Systems related to energy efficiency such as efficient lighting and daylighting, natural ventilation, and controls can contribute to a quality work environment. Marketing efforts need to illustrate what a high performance workspace looks like and its value (utilizing existing efforts like Future@Work and the Lighting Design Lab). These efforts should connect energy efficiency to those features that produce a high performance workspace. This message needs to be developed and spread by market actors that do real estate marketing. Partnerships with user groups should be formed to develop measurement methods that show the relevant benefits for these quality workspaces. This can lead to guidelines and standards regarding work environment that can be incorporated into the specifications used by large institutional building owners.

[2] Leadership in Energy and Environmental Design (LEED) is a rating system developed by the U.S. Green Building Council that provides guidelines, criteria, and a certification process to achieve certain green building performance levels.

Table 3. Characteristics of the Work Environment Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms
–User Groups and Peer Organizations –Large Institutional Users –Brokers	–Future@Work –Lighting Design Lab –Green Buildings	–Targeted Marketing –Measurement/Benefits –Specifications/Guidelines

Technology

Improvements in technology and building industry interest in 'smart buildings' that perform better and are easier to manage (Table 4) can be leveraged to raise building energy efficiency. Marketing efforts ought to target and involve property management groups to help develop and generate demand for applications of this technology to improve energy efficiency. Design and delivery professionals that offer 'life of the building' services (from preliminary design through maintenance and operation) need to be utilized and supported to apply and deliver this technology and related services. Research organizations ought to work with these groups and manufacturers and vendors to utilize these tools for energy management. The target market groups should be encouraged to apply these tools to measure building performance and establish performance benchmarks. The application of better control systems and information management tools can be incorporated into codes and standards where they contribute to the health and safety of building occupants.

Table 4. Characteristics of the Technology Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms
–Property Management Groups –Design and Delivery Professionals –Manufacturers/Vendors	–National Lab Research –Technology R&D –Industry Marketing	–Targeted Marketing –Research –Measurement/Benchmarks –Codes and Standards

Changes in the Development Process

Changes and improvements in the development process provide opportunities to integrate energy efficiency into industry practices (Table 5). Existing information management tools can be utilized to further incorporate energy efficiency into building design, and project and property management. Partnerships can be formed with leading edge design and delivery firms (and the design industry) to develop energy efficiency specialists that can be part of integrated design teams. The experience of these firms can be used to develop recommendations for the integration of energy expertise into the development process. Building commissioning is an important quality control and feedback mechanism that supports better building performance and integrated building delivery. Consolidation in the building development industry has led to large, vertically integrated real estate firms that control large amounts of space and that have a long-term interest in the buildings they develop, own, and operate. These important market actors need to be targeted to take advantage of improvements in the development process that can encourage energy efficiency and that also support their business interests.

Regulation

Proactive regulation can be used to support and encourage higher levels of building energy efficiency that go beyond energy codes (Table 6). This can be done by providing incentives to developers for meeting a public good. For example, a developer might be allowed to add another floor to a building by meeting a certain energy efficiency target.

Table 5. Characteristics of the Development Process Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms
–Vertically Integrated Real Estate Firms –Leading Edge Design and Delivery Firms –Academic Institutions	–Development of Design and Management Tools –Energy/Environmental Specialists –Building Commissioning	–Targeted Marketing –Information Management and Design Tools –Training –Design Recommendations –Building Commissioning

Also, regulatory guidelines can be developed that make it easier to apply new technologies or practices. Design review processes can be used to illustrate best practices for meeting community design goals by considering options with building materials and landscaping that can improve energy efficiency. Developers and design and delivery professionals need to work with progressive regulators to develop regulatory mechanisms that utilize these different regulatory tools to encourage best energy efficiency practices in ways that are sensitive to local needs and interests.

Table 6. Characteristics of the Regulation Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms
–Progressive Regulators –Developers –Design and Delivery Professionals	–Green Building Regulations/Guidelines –Existing Development Incentives –Energy Code Support –Impact Fees	–Energy Codes –Development Incentives –Regulatory Guidelines –Design Review –Utility Hook Up Fees

Energy Price Volatility and Reliability

Energy efficiency can be used as a tool to increase building reliability and to reduce risk associated with energy price volatility and reliability (Table 7). Marketing efforts need to show how energy efficiency can be used to increase reliability and reduce risk. The less energy an organization uses, the less susceptible it is to power outages and price spikes. More efficient equipment and better controls can be sold in terms of reliability. Daylighting or natural ventilation can allow a space to be functional even if power is lost. A more flexible and reliable space offers greater value and should appeal to investor and user interests. This strategy utilizes design and delivery professionals working in conjunction with property manager and user groups to develop ways that take advantage of energy efficiency to increase reliability and reduce risk.

Overall Marketing and Coordination Efforts

Overall marketing and coordination efforts should focus on increasing the relevance of energy efficiency to key market actors (Table 8). Marketing needs to utilize market actors and intermediaries. Related efforts should be coordinated and leveraged. For example, Energy Star Buildings is a related effort that targets some of the key actor groups (real estate firms/developers and investors).

Table 7. Characteristics of the Energy Price Volatility and Reliability Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms
–Property Management Groups –Investor Interests –User Group Networks –Design and Delivery Professionals	–Technology R&D –Utility Rate Structure Research/Demonstrations –Energy Service Providers	–Targeted Marketing –Methods to increase reliability and reduce risk –Research and Guidelines –Utility rate structures

Table 8. Characteristics of the Overall Marketing and Coordination Market Transformation Strategy

Key Market Actors	Existing Activities	Mechanisms

–Institutional Users and User Groups
–Design and Delivery Professionals
–Vertically Integrated Real Estate Firms/Developers
–Investors
–Progressive Regulators
	–Energy Star Buildings
	–Existing Alliance Initiatives
	–DOE Commercial Buildings Roadmap
	–Market Transformation Organization Initiatives
		–Marketing that:
		  –Utilizes market actors (brokers, etc.)
		  –Utilizes market intermediaries (universities, peer groups)
		–Overall Coordination of related efforts

Putting It All Together

The research we have conducted and the proposed strategies provide a starting point for program development. Recently, a number of other research efforts and evaluations of programs focused primarily on market transformation in the new commercial building market have been completed (Dethman, Peters & McRae 2001; Heschong Mahone Group 2000; Mahone et.al. 2001; Quantum Consulting 2001; Reed, Oh & Hall 2000; Reed 2001). This research and evaluation work has taken a broader look at the market. It has expanded on the structure of the market and applied market theory on how market change occurs to guide their research. This work has produced a complimentary set of conclusions that can be used to support the development of the next generation of market transformation programs.

An example of a next generation program is the Northwest Energy Efficiency Alliance's Commercial Buildings Initiative (CBI). Beginning in the Fall of 2000, the Alliance began a planning process to establish a long-term strategy for Alliance market transformation activities in the commercial building sector after the conclusion of the

Efficient Building Practices Initiative (EBPI). Market research including our commercial office building research and the evaluation of the EBPI (Dethman, Peters & McRae 2001) contributed to this planning effort.

The Alliance developed a number of planning principles from these analyses including: "connecting efficiency to market values, relationship-based marketing over general advertising, an acknowledgement of this sector's complexity and the need for equally complex program strategies, and the importance of institutionalizing efficiency in the development and operation of commercial buildings as well as by decision-makers." Four goals were identified for the CBI: "increase the awareness of and build demand for energy efficiency in terms the market understands and values; develop and disseminate information to market decision-makers that is credible, reliable and useful; build and maintain the capability to deliver efficient products and services in the marketplace; and standardize energy efficiency as part of normal practices within the market." Six strategies were developed for CBI: an overall "business-to-business" marketing and communications strategy; a "market connections" strategy to provide commercial building efficiency information; pursuit of a better understanding of particular target markets (such as retail outlets, schools, and grocery stores); education, training, and technical assistance; "efficient business technology solutions" to bring new ideas to the marketplace; and energy codes and standards (Ohrenschall 2001).

The CBI is an example of a next generation commercial building program that attempts to apply many of the concepts and ideas from recent commercial building market research and evaluation. The success of new programs like the CBI depends on the ability of the initiative to engage the building development industry and users and to develop partnerships with key players in the industry. These market players need to contribute insights and resources in order for market transformation strategies to be both legitimate and potentially effective. An important first step in this process is partnering with market intermediaries that have existing relationships with key market actors and with market firms and organizations with complimentary interests.

Expanding the Concept

Our research focused on new commercial office buildings. Yet office buildings are one of many commercial building market segments and the majority of commercial buildings are existing buildings. More research is needed in each of these two important areas, but the concepts we have developed are relevant for most building segments. Successful market transformation efforts in any commercial building market must occur at multiple levels by establishing the relevance of energy efficiency and institutionalizing the demand and supply of energy efficient buildings. And for energy efficiency to diffuse in the market place, it must be embedded in complementary interests in the building industry. The complimentary interests we identified are most relevant for office buildings and larger development projects, but can be used to identify opportunities in other building segments.

The next generation of commercial building programs needs to apply these ideas as well as ideas from related research. These programs must strive to continue to improve their understanding of the marketplace by engaging market actors in the development and delivery of their programs. And consistent evaluation efforts must be developed that rely on market indicators so that we can continue to improve the effectiveness of these programs. This will

lead to effective commercial building market transformation programs that are more fully engaged in the marketplace.

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