RESEARCH ARTICLE OPEN ACCESS

Parameters of Upgrading Existing Building into a Green Building

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ABSTRACT
Before turning to specific programs for upgrading buildings, it's important to understand the market dynamics of greening existing buildings. From a macroeconomic perspective, energy efficiency upgrades represent the most cost-effective way to meet growing energy demands. From a microeconomic perspective, recent studies have shown that energy-efficient and certified green buildings merit higher market values, greater rents, and higher occupancies. From a corporate sustainability viewpoint, greening existing buildings is a direct way to reduce a company's carbon footprint. As a result, corporate real estate managers in the United States have begun to decide in favour of greening both owned and leased buildings, seeing many economic benefits from this switch. Green buildings offer many marketing benefits for building owners and tenants, including opportunities for creating new green "brands" and also "future-proofing" their real estate against both future energy price increases and also value erosion as the trend toward green buildings continues to grow. Marketing benefits will vary by geographic location, building and tenant type, and other factors, but they are present in all privately owned real estate.
Keywords **-** About five key words in alphabetical order, separated by comma

I. INTRODUCTION

What is Green Building? A Green Building refers to the efficient use of energy flows. A Green Building is one which uses less water, optimises energy efficiently, conserves natural resources, generates less waste and provides healthier spaces for occupants as compared to a conventional building. The parameters which relates to this concept are nothing but

1 Markets for Greening Existing building
- 1.1 Marketing benefits of Greening existing office building
- 1.2 Greening existing retail buildings
- 1.3 The business case for Greening existing buildings

2 Cost of upgrading
- 2.1 Cost drivers for Greening existing buildings
- 2.2 Cost for Greening existing buildings
- 2.3 Return on investment
- 2.4 Commercial Benefits of Green Buildings

3 The Challenges of Greening existing buildings
- 3.1 Barriers
- 3.2 Challenges

4 Approaches

II. MARKETS TRENDS:

RREEF research reported in February 2009 its expectation that "major real estate markets—the markets where institutional investors focus their attention—will be pushed even faster to the tipping point where green building becomes the market standard." Even with the continuing global economic recession, government policies will continue to accelerate the push toward greener buildings, as will tenant demand, especially from corporate real estate executives. There is also "no pronounced indication that major institutions are pulling back from their greening commitments" as investors. In this context, greening existing buildings, especially upgrading energy efficiency, can be seen as a "defensive strategy," since these less-efficient properties risk "market decay" in the form of lower rents and higher vacancies, "as tenants increasingly migrate to more modern, greener buildings."

1.1 MARKETING BENEFITS OF GREENING EXISTING OFFICE BUILDINGS

If green buildings really deliver short-term marketing benefits, we should be able to find some good examples in a number of cities that illustrate the results of the studies cited above. Since most of the studies cited are based on new buildings, it's instructive for the purposes of this book to try to find LEED-EB commercial office projects that illustrate the same benefits. Here's one such project.

1.2 GREENING EXISTING RETAIL BUILDINGS

Many large retail store chains have begun to build new LEED-certified stores in the United States and Canada, as well as in Europe (with the U.K.'s BREEAM certification system or others that are

evolving in such places as France and Germany), but greening existing buildings has barely started. Many types of stores constitute the retail sector, including clothing, grocery, restaurants, and the entire gamut of shopping, entertainment, and eating destinations. So far, without strong consumer demand, the push to green existing stores has been basically nonexistent. However, one store type that lends itself well to LEED-EB certification is the grocery store, for several reasons. Food stores use a lot of energy: think of 24/7 refrigeration and all the energy for cooking and washing in the prepared foods department. Grocery stores also use a lot of water, and they occupy a considerable site area. They also have large waste disposal costs. Finally, they tend to be large chains with centralized purchasing, so that many of the LEED-EB programs can be easily implemented.

1.3 THE BUSINESS CASE FOR GREENING EXISTING BUILDINGS

A major grocery chain, Stop & Shop, located primarily in the eastern United States, has implemented the LEED-EB system in more than 50 stores. Stop & Shop's parent company, Ahold, has a strong corporate responsibilitycommitment based on a partnership with customers to build a more sustainable future. Ahold operates 1300 stores along the East Coast, including the Stop & Shop chain. In 1998, Stop & Shop developed what they called the Low Energy SuperStore (LESS) prototype. As a result, Stop & Shop/Ahold set a goal of building a superstore that uses about one-third less electricity than conventional supermarkets. To target transformative changes, the company focused on savings in lighting and heating, ventilating, and air-conditioning (HVAC); super-efficient refrigeration, systems integration; and building envelopeimprovements. In 2001, they piloted related innovations by opening a LESS facility in Foxboro, Massachusetts. The value of the model is demonstrated by annual electricity savings of 8 million kilowatthours, which eliminates emissions of nearly 1000 tons of CO annually. A few years later, the company decided to benchmark its latest store prototype, in Southbury, Connecticut. Store 621 was an ENERGY STAR labelled model that opened in 2005. Stop & Shop stores have excellent energy efficiency—a company review confirmed that stores built by Stop & Shop after the LESS facility were more sustainable, considering particularly their energy use. In mid-2007, Stop & Shop began the USGBC's Volume Certification program using the LEED-EB program as the basis for store certification assessments. The 51 Stop & Shop grocery stores in the certified portfolio are a subset of a much larger group of company stores that share many similar characteristics, making them excellent candidates for the volume LEED-EB certification process. All of the buildings are built from a common specification; further selection criteria included preliminary LEED-EB checklist evaluations, ENERGY STAR ratings, store management/ownership,
location, and age. All of the selected stores are located in or near New England.

In May 2008, after about an year's effort, the project team succeeded in achieving LEED certified-level status for the 51-store portfolio, representing nearly 3.4 million-square-feet of retail space. Stop & Shop is the first company and first supermarket chain in the United States to be awarded LEED-EB certification in this manner.

1.3.1 THE BUSINESS CASE FOR AHOLD/STOP & SHOP

The most prominent factors in making a business case for LEED were the ability to use the system as a framework for creating new design metrics and the benefit of reduced certification costs per store. The switch from single-building certifications to a volume perspective with attractive economies of scale is critical to giving larger retailers cost-effective incentives to comprehensively address their environmental impacts. From a marketing perspective, LEED is an internationally known standard, which appealed to Stop & Shop as a nationally distributed retailer with considerable brand equity. USGBC's Volume Certification program helped Stop & Shop to further standardize environmentally responsible programs in their stores by integrating green operations into multiple existing buildings in their portfolio all at once, using the LEED-EB rating system. The certification process met Stop & Shop's overarching goal: to confirm through third-party validation that it was successfully applying sustainable principles to store operations.

III. COST OF UPGRADING

3.1 COST DRIVERS FOR GREENING EXISTING BUILDINGS

What drives the costs of greening existing buildings, especially those project teams using the LEED-EB process? First let's look at factors relating to upgrade and renovation costs. Then we'll look at factors relating to LEED-EB process management.
Table

3.1.1 TYPE OF DRIVER RELATIVE INFLUENCE

KEY. INFLUENCERS OF LEED-EB PROJECT COSTS*
Owner's experience with building retrofits Medium
Team experience with LEED-EB projects High Level

of LEED certification desired Medium to high Type of ownership Medium Team structure and process Low to medium Certification process and scope,including volume certification Low to medium LEED documentation difficulties Low to medium Consultant fees and internal time requirements Medium too high

3.2 COSTS OF GREENING EXISTING BUILDINGS

Costs are the single most important factor in the building owner's world. The reason is simple: Costs are "hard" because they are real and occur in the present (and in the short term, revenues are fixed, so extra costs reduce profits), whereas benefits such as projected energy savings, water savings and productivity gains, though significant in the long run, are "soft" because they are speculative, may accrue to others and always occur in the future.

Therefore, a cost-benefit analysis at the beginning of each LEED-EB project is crucially important to convince building owners, managers, and other stakeholders to proceed with the LEED certification effort.

The biggest barrier to greening existing buildings is the perception that they cost more to the owners than they deliver in the way of benefits. The World Business Council for Sustainable Development reported this widespread perception in an international survey in the summer of 2007. More than 1400 respondents in a global survey estimated the additional cost of building new green buildings at 17 percent above conventional construction; more than triple the actual cost difference of about 5 percent of original budget. At the same time, survey respondents put greenhouse gas emissions from buildings at 19 percent of world total, while the actual number of 40 percent of total emissions is more than twice the amount, counting emissions from both residential and non-residential buildings.

3.3 RETURN ON INVESTMENTS

For many green building strategies, rapid return on investment (ROI) is an important consideration for the investor. Reducing the initial cost will hasten return on investment. To fully understand ROI, one must first identify the various areas of value. Some areas of green roof value are difficult to quantify. Green Roofs for Healthy Cities, the green roof industry trade organization, has formed two committees to develop a life-cycle cost-analysis tool and an energy-modeling tool. Though these committees are working simultaneously, the energy-modeling tool is a large component of the lifecycle cost-analysis tool and must be completed before the life-cycle cost analysis can be completed.

3.4 COMMERCIAL BENEFITS OF GREEN BUILDINGS

In the past two years, several important studies of the commercial benefits of green buildings all pointed in the same direction: green buildings make more money for their owners.

IV. THE CHALLENGES OF GREENING EXISTING BUILDINGS

The challenge of greening existing buildings is to demonstrate achievement while still respecting budgets, addressing tenant/occupant resistance to change, and meeting corporate constraints on activities. With the global recession beginning to hit hard on commercial real estate in 2008 and 2009,
the challenge of finding investment and debt capital to upgrade existing buildings is significant, even as the returns from such investments continue to increase, something we will describe in far more detail in Chap. 3. One approach to greening existing buildings is through the adoption of a very specific protocol, either the U.S. Green Building Council's LEED rating system or by securing an ENERGY STAR label for a specific building. Building owners and managers have adopted both approaches, since both provide third-party certification of achievement. ENERGY STAR assesses buildings according to their relative energy use among similar buildings nationwide, assigning a score based on the percentile ranking and awarding a label only for buildings in the top quartile. LEED focuses on a broader array of environmental attributes, including considerable focus on energy savings, but also promoting sustainable site selection and land use, water conservation, environmental preferable materials, and waste disposal, along with indoor environmental quality.

3.1 BARRIERS TO GREENING EXISTING BUILDING

To remove or reduce the effect of these inhibiting factors on the rate of green building renovations and operations. These barriers or inhibiting factors reduce the growth rate of green building renovations and make them more costly. In a 2008 survey cited above, 750 corporate real estate executives rated the following as presenting an extremely or very significant obstacle to green construction: higher construction costs (61 percent), the length of the payback period (57 percent), and the difficulty quantifying the benefits of green building (43 percent).

4.1.1 DIVERGENCE BETWEEN CAPITAL AND OPERATING COSTS

The first barrier is the divergence between capital and operating budgets in most private sector and public organizations, which makes it difficult to secure funds for investments in energy-efficiency measures that have more than a one-year payback, in terms of savings versus investment costs. This barrier can be overcome by having a clear policy for energy efficiency investments and a clear path for acquiring the necessary financing.

4.1.2. SPLIT INCENTIVES BETWEEN TENANTS AND OWNERS

The second barrier, split incentives between tenants and building owners, affects only rental properties and only in the short run. In other words, landlords with triple net leases just pass along the energy costs to tenants and don't have a direct incentive to make energy efficiency investments that will benefit primarily the tenant.

4.1.3. PERCEIVED HIGH COSTS OF GREENING

The third barrier, the perceived high costs of greening an existing building, in comparison with the future benefits, is probably lower now than it has been as people get more familiar with and more comfortable with green building retrofits.

4.1.4. UNPROVEN FUTURE BENEFITS

The fourth barrier, the unproven nature of future benefits, is easier to overcome with whole building energy modeling, something that is affordable for large buildings.

4.1.5. INCENTIVES TOO SMALL TO CHANGE BEHAVIOR

The fifth barrier stems from incentives that are insufficient to change behaviour. Per square foot can be taken for measures affecting any one of three building systems: the building envelope, lighting, or heating and cooling systems, but this level of savings may be quite difficult to achieve in retrofits.

3.1.6. LACK OF FINANCING FOR ENERGY UPGRADES

Making such investments, with 42 percent of more than 1400 respondents citing this barrier. Certainly the worldwide credit crunch in 2008 and 2009 has made borrowing money, even for clearly beneficial reasons, much more difficult.

3.1.7. WIDE VARIABILITY OF ENERGY COSTS

The seventh barrier concerns the wide variability of energy costs in various regions of the United States and Canada, making it difficult for national firms to put companywide policies in place when energy costs might easily vary by a factor of two or three between locations.

4.1.8. ORGANIZATIONAL DYNAMICS

In a multitenant building, it takes participation from nearly all the tenants to achieve a LEEDEB

rating, and that can be very difficult to achieve.

4.2 CHALLENGES

- Challenge one: Diversion between capital and operating costs which makes it difficult to secure funds for investments in energy-efficiency measures that have more than a one-year payback, in terms of saving versus investment costs.
- Challenge two: Split incentives between tenants and owners.
- Challenge three: Perceived high costs of greening.
- Challenge four: Unproven future benefits are easier to overcome with whole building energy modeling, something that is affordable for large buildings.
- Challenge five: Incentives too small to change behaviour.
- Challenge six: Lack of financing for energy upgrades.
- Challenge seven: National & state level policies of government.
- Challenge eight: Organizational dynamics in a multitenant building, it takes participation from nearly all the tenants to achieve a LEED-EB rating, and that can be very difficult to achieve.
- Challenge nine: Living Building Challenge is focused more on the end game, the level of performance for which everyone is ultimately striving.

V. APPROACHES

10-point program for approaching the greening of existing buildings, focused on the activities of decision makers among property owners, building and facility managers.

- Executive leadership in creating a mission, clear goals, and sustainability policies.
- Organizing the task force.
- Examining options through building audits and focused decision-making.
- Budgeting for improvements and upgrades.
- Internal and external communications, both during the project and afterward.
- Knowledge management, how to keep the greening of the building going forward.

- Instituting lean thinking and continuous improvement, incorporating innovations.
- Tracking green building costs and benefits, especially in energy, water, and waste.
- Carbon/water footprint calculations, reductions in emissions and tracking.
- Sustainability reporting for the organization, going beyond one building at a time.

VI. Conclusion

The conclusion meant to be exhaustive. New companies and new products are emerging rapidly. Instead it is meant to provide a feel for the innovation in the building and construction materials sector. Moreover, new companies are creating new jobs, in fact green jobs.

We conclude to points as follows:

- While there is a tremendous opportunity for green development and even greater opportunity to realize value and values by green redevelopment.
- The difference between the Living Building Challenge and LEED-EB is that LEED does a job with current operations for improved performance.
- Many of the benefits such as health and productivity can be hard for building management to track, while presenting data on utility saving in terms of return on investment is more straightforward.
- Long-term investments in energy efficiency and water savings are the economic drivers for greening existing buildings.

VII. ACKNOWLEDGEMENT

I express my deep sense of gratitude to my guide and seminar coordinator ***Dr.R.K.Jain*** *Principal, Pad. Dr. D.Y.PATIL College of Engineering Pimpri Pune, for the valuable guidance, constant encouragement and creative suggestions offered during the course of this seminar and also in preparing this report.*

I express my sincere thanks to ***Dr. R.K.Jain****, Principal Pad. Dr. D.Y.PATIL College of Engineering Pimpri Pune****, for providing necessary facilities and their sincere co-operation.*

My sincere thanks are extended to all the teachers of the Department of Civil Engineering for their help and support.

Above all I thank GOD, the almighty for his grace without which it would not have been possible to complete this work in time.

Rupali Manoj Kapure

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