

FINANCIAL AND ECONOMICAL RISKS IMPACTING COST OF LEED CERTIFIED PROJECTS

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Green buildings have benefits for the environment, which has been acknowledged by the vast majority of building professionals. LEED is one of the most recognized green building certification systems in the world. However, issues related to financial aspects of the entire process and LEED certification may be significant and constitutes new financial burdens to the cost of the projects. After a diligent literature research, main issues related to cost can be identified under four major categories such as; cost of the certification process, scarcity of insurance solutions, rental due to delay related to green construction procedures and conditions, and failure to use of financial incentives (tax/loan discounts, low financing rates) because of delays or lower certification levels than expected throughout the LEED certification. This study focuses on the assessment of professionals' experiences about the financial and economical risks green buildings and their impacts on cost by identifying the most common drawbacks and evaluate relevant precautions against them. Analysis results show that high cost of certification process is one of the concerns for the majority of the professionals. Rental loss due to delay related to green construction procedures and conditions, costs related to certification, documentation, practices and design are found as the other risk factors in the study. Proper allocation of such risks in contract documents and special insurance products with appropriate endorsements could be used to mitigate related risks.

Keywords: Green building, Risk management, LEED certification.

1 INTRODUCTION

Construction industry uses different kinds of resources and sustainable construction is a key endeavor to minimize the adverse effects and impacts of the sector on the environment. Green building concept is growing and receiving more attention of construction professionals as a result of sustainability efforts. Green building approach can be defined as a structure that is designed, built, operated, maintained, or reused to protect occupant health, use wisely natural resources and reduce the environmental impact. According to Kubba (2010), green building is designed for optimum energy efficiency and is constructed with a preference for natural resources, reclaimed, and recycled materials.

The green buildings are recognized and certified by different rating systems in most countries. These systems are now routinely used as assessment tools all around the world (Gurgun *et al.* 2016). Looking into certification systems, Leadership in Energy and Environmental Design (LEED) is one of the most frequently used systems for the recognition of

"green" buildings. According to the United States Green Building Council's public project directory (2017), there are 100,202 registered or certified LEED projects worldwide. Comparing green and traditional building projects, both similarities in construction processes can be observed as well as differentiations that are specific to green ones. Particularly, variations require meticulous focusing in order to control discrepancies in project's schedule and cost estimations. Potential risks should be identified and analyzed carefully to administer proper risk management plans to anticipate and mitigate them to prevent problems that can lead to failures in achieving objectives.

Sustainable applications are becoming frequently practiced in the construction industry in recent years. There are several drivers for project owners and developers that encourage implementation of green building applications (Darko *et al.* 2017). Looking into the U.S., environmentally focused design and construction are either incentivized or mandated by many federal, state and local incentives (Anderson *et al.* 2010). According to Coglianese (2009), means and methods used in green buildings are becoming contract requirements and the parties involved in green projects are subjected to risks that they did not encounter before. Achieving project objectives can be risked due to unexpected risks causing failures in different aspects of the projects. Deciding on constructing green instead of conventional practices can provide environmental and financial benefits, but also can lead to several challenges.

This study is to investigate financial and economical risks that can be encountered in green building projects that are aiming to be certified by green building certification systems. Managing risks related to green implementations together with traditional construction risks is essential in the success of the projects. In order to identify financial and economical risks in green buildings, an extensive literature survey was conducted and summarized. The following section lists these risks and their affects that can adversely contribute to achievement of projects' sustainability goals.

2 FINANCIAL AND ECONOMICAL RISKS IN GREEN BUILDING PROJECTS

Financial or "money" related risks frequently constitute the biggest concern for the investment decision. Green building projects usually have financial benefits expected in long-term, which corresponds to numerous components frequently addressed as tangible and intangible assets. The long-term value associated with sustainable construction evaluates the Net Present Value of the building using modeling predictions (Sparkling 2012), which are based on Life Cycle Cost, defined by Kats (2006) as savings from energy and water use, and other attributes. According to Wang and Ng, challenges faced in green construction can be explained that green construction tends to cost more to construct (Wang *et al.* 2007, Turner 2005). The fundamental challenge in green construction is to determine the optimal balance between the various constraints of the construction act with certification process. A higher certification is usually associated with a greater premium paid (WorldGBC 2013). Finance related precautions should provide some clarification of the assessment tools for sustainable building, which in turn assist stakeholders such as investors, developers, tenants, and government bodies (Chandra and Nugraha 2014).

After a diligent literature research, concerns related to financial risks are categorized into four main groups as; the high cost of the certification process, scarcity of insurance alternatives, the rental value of green buildings, and the financial impacts of not being able to achieve certification goals. These risks are summarized and discussed in the following sections.

2.1 Cost of Certification Process

After the settlement of planning through green building certification, the application process for LEED may add new financial burdens. The cost of documentation and registration for certification varies from project to project depending on several factors such as project type, size, outsourcing for LEED-specific services, the commissioning process, and design properties (U.S. Green Building Council 2014). According to Principal's Report (2010) registration and certification fees are roughly 3-5 cents per square foot, which differs from the size of the project and other factors. On the other hand, Mapp *et al.* (2011) found out the direct costs of LEED certified bank buildings are less than 2% of the total project cost. Extra design, documentation or commissioning costs influence this ratio remarkably. Bayraktar *et al.* (2011) found out that certification fees and expenses for handling paperwork were conferred as important constrains for green certification in the U.S. According to their questionnaire, the main cause of financial burden is originated from this process often result with overspending and overruns.

2.2 Finding Appropriate Insurance Solutions

When green technology does not perform as expected in terms of cost savings, basic function, qualification for incentives etc. insurance market rises to the occasion. As green building risks influence a wider community, insurance market aligned its policies according to these new cases and created new products according to LEED. Advanced insurance products have proliferated as cases of litigation arise between contractors, developers and owners. Some insurance solutions would cover both traditional and green buildings and provide opportunities from hiring an experienced consultant to rebuild the facility according to the aimed certification level (Silverman 2007). It is possible to see that exclusive insurance deals cover indoor environmental issues or reputational losses. The scope of property coverage would be determined by the contract between parties, which have to be clearly identified to prevent further conflicts. Policyholder rights against contractors and/or architects when construction projects fail to obtain LEED certification or yield the benefits envisioned (Nevius 2009).

2.3 Rental Loss Due to Delay Related to Green Construction and Certification Procedures and Implementations

Duration related problems are one of the major drawbacks that industry concerns. If problems related to the schedule of the project become more apparent, it would be easier to implement solutions and take suitable precautions, which can be applied immediately in certified green building projects. Using special materials, applying unusual methods, and going through LEED-certification procedures bring out new set of risks and challenges that can affect project schedule. The commissioning of a green building can differ from a traditional project. Testing of heating, ventilating, air-conditioning, plumbing and electrical systems are usually advanced systems and requested to qualify for earning points during the certification process of the building as a green building. Finding the proper solution between owner's requirements, certification and country's legal constrains are more complex and time consuming. Substantial or final completion process of green projects would necessitate experienced consultancy. Hwang and Leong (2013) found that while traditional projects were delayed by an average of 16%, green projects fell 32% behind schedule. This situation causes delay and results in late rental income. Insurance companies offer coverage to additional hard and soft expenses, loss of net income or penalties related to an extended delay (Harrington 2009).

2.4 Failure to Use Financial Incentives (Tax/Loan Discounts, Low Financing Rates) Due to Delays or Lower Certification Levels than Expected

Failure to achieve the expected level of LEED certification prevents the building owner from taking advantage of financial incentives in green building projects resulting. Such a failure results with missing the opportunity to take advantage of desired tax discounts, convenient tax rates, utility and loan discounts. The responsibility for failing to achieve the expected level of certification needs to be specified in the contract. Also, the responsibility for any loss of financial incentive caused by delays that are related to green implementations should also be addressed in the contract documents. Southern Builders Inc. vs. Shaw Development LLC was the first green construction lawsuit in the U.S. where the developer claimed a loss in tax credits under a state-run program due to the contractor's failure to achieve certification in a timely fashion (Spencer 2010).

Using green building consultancy can contribute to reduction, mitigation or prevention from probable financial losses originating from limited experience in green building certification procedures. An efficient schedule containing all of the traditional construction and certification related processes is required to be considered with the possible obstacles and bottlenecks. The scheduling data could be obtained from previous similar project records and various scheduling software programs can be used to estimate the most probable duration for the project.

3 SUMMARY AND CONCLUSIONS

This study aims to investigate and understand the financial and economical risks that have impact on project costs in green buildings in addition to imply the importance of the identified risks in planning of the projects. According to the existing literature, cost of certification process, scarcity of insurance solutions, failure to use financial incentives due to delays or lower certification levels than expected and rental loss due to delay related to green construction and certification procedures and implementations are major drawbacks in building going through green building certification systems.

In order to be able to prevent cost overruns and other targeted objectives, project parties are required to become more familiar with the risks surrounding the projects and certification requirements. Also, sustainability goals should be set from the beginning and clearly described in the contract while the scope, responsibilities and risks are distributed fairly between parties. Exclusive insurance solutions for green certification should be carefully utilized to avoid undesired circumstances, mitigate the effects and provide appropriate endorsements. Financial incentives dependent on duration could use insurance solutions. Risk management strategies have to be considered before the construction act to achieve a win-win situation for the stakeholders and environment.

References

- Anderson, M. K., Bidgood, J. K., and Heady, E. J., Hidden Risks of Green Building, *The Florida Bar Journal*, 84 (3), pp.35-41, 2010.
- Bayraktar, M. E., Owens, C. R. and Zhu, Y., State-of-Practice of Leed in the United States: A Contractor's Perspective, *International Journal of Construction Management*, 11(3), 1-17, 2011.
- Chandra, H. P., and Nugraha, P., Perceptions of Contractors and Consultants Toward Application of Greenship Rating Tools on Apartment Buildings in Surabaya, *IPTEK, The Journal for Technology and Science*, Vol. 25, No. 1, April 2014.
- Coglianese, M. P., Construction's Legal Risks in the New Green Paradigm, *Construction Law*, 9 (12), p.43, 2009.
- Gurgun, A. P., Arditi, D., and Vilar P. C., Impacts of Construction Risks on Costs in LEED-certified Projects, *Journal of Green Building*, 11(4), 163-181, 2016.

- Harrington, J. S., Green Coverage in Builders' Risk Insurance, 2009. Retrieved from <http://www.mynewmarkets.com/articles/103560/green-coverage-in-builders-risk-insurance> on February 4th, 2017.
- Hwang, B. C. and Leong, L. P., Comparison of Schedule Delay and Causal Factors Between Traditional and Green Construction Projects, *Technological and Economic Development of Economy*, 19 (2), pp.310-330, 2013.
- Kats, G., Greening America's Schools: Cost and Benefit, 2006. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=2908> on February 9, 2017.
- Kubba, S., *LEED Practices Certification and Accreditation Handbook*, Elsevier Inc, USA, 2010.
- Nevius, J. G., Green-Building and Renewable-Energy Insurance Claims: Where Are We Now?, *Environmental Claims Journal*, 21:4, 285-295, DOI: 10.1080/10406020903109640, 2009.
- Principal's Report, Does LEED Certification Add Cost to Buildings?, Retrieved from www.ioma.com/design on February 4, 2017
- Silverman, S. D., Green Building Gains Insurance, *Commercial Property News*, 21, 1, ProQuest Central pg. 6, Jan 1, 2007.
- Sparkling, A. E. Cost Justification for Investing in LEED Projects, *McNair Scholars Research Journal*: Vol. 4: Iss. 1, Article 7, 2012. Retrieved from <http://commons.emich.edu/mcnair/vol4/iss1/7> on February 4, 2017.
- Spencer, J., Contractor Risks on LEED and Green Construction Projects, *Construction Law*, 18 (4), p.41, 2010.
- U.S. Green Building Council, 2017. Retrieved from <http://www.usgbc.org/projects/> on February 02, 2017.
- U.S. Green Building Council, 2014. Retrieved from <http://www.usgbc.org/certification> on February 04, 2017.
- Wang, L., Lin, Y., and Lin, P., Dynamic Mobile RFID-based Supply Chain Control and Management System in Construction, *Advanced Engineering Informatics*, 21(4), 377-390, 2007.
- WorldGBC, The Business Case for Green Building: A Review of the Costs and Benefits for Developers, Investors and Occupants, *World Green Building Council*, 2013.