

# SUSTAINABLE PROJECT MANAGEMENT FOR GREEN CONSTRUCTION

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**Abstract**— Sustainability is a standout amongst the most significant difficulties within recent memory. How might we create success without trading off the life of who and what is to come? Organizations are incorporating thoughts of sustainability in their showcasing, corporate correspondences, yearly reports and in their activities. It is therefore unavoidable that 'sustainability' will discover its way into undertaking project administration techniques and practices soon. This paper investigates the idea of supportability and its application to extend the executives. After a survey of the applicable writing on sustainability, its driving components are recognized. In view of an investigation of the rare writing on the utilization of these components in undertaking the board, a working meaning of 'Sustainable Project Management' and its ideas are inferred. In the last area of the paper, the ramifications of these ideas for task the board procedures; reports and capabilities are additionally dissected and identified with the main ideas and benchmarks on project management. A survey of ideas of practical advancement and its appraisal are given in this paper and some basic remarks made. Considering the size of the effect of the development business on the earth, a significant improvement in productivity and adequacy of the development procedure is important to reestablish the biological parity. Further improvement of life cycle evaluation systems and social and monetary parts of sustainability will assume an undeniably significant job.

**Index Terms**—Sustainability, sustainable construction, sustainability criteria, Green Construction

## I. INTRODUCTION

Sustainable development or biologically maintainable advancement was characterized by WCED [1] as improvement that addresses the issues of the present without trading off the capacity of future ages to address their very own issues.

The term 'advancement' incorporates exercises crosswise over various industry segments. As the effect of the development business on nature rates as one of the most astounding among every one of the enterprises, an examination of the development business is important to limit its effect on the earth, consequently the rise of the term 'sustainable construction development'. An unmistakable meaning of 'supportable development' as a subset of reasonable advancement will fill in as a beginning stage for any such investigation. With regards to this exchange, the word 'construction' suggests a procedure which begins a long time before the real on location building action starts and stretches out to post site-building exercises, for example, appointing and resource the executives. Truth be told, it covers a whole task improvement life cycle. The term manageable development was initially proposed to portray the duty of the development business in achieving sustainability.

The standards of supportability inside development industry as including:

- Showing mercy for individuals by guaranteeing they live in a solid, sheltered and beneficial fabricated condition and in agreement with nature.
- Assuring the interests of who and what is to come while in the meantime, addressing the present needs.
- Calculating the advantages and expenses of the task to society and condition.
- Reducing harm to the ecological and its assets.
- Remodeling the nature of structures and benefits and advance social cohesiveness.

## II. METHODS AND SYSTEMS IN GREEN CONSTRUCTION

Based on possess and national inquires about various plans, useful techniques and materials for upgrading the utilization of power and exploit regular assets some methods are:

### ➤ Solar Panels

Gadgets that transform light into power are termed as solar panels. They are alluded to as "sun based panels" on the grounds that most of the time, as an amazing wellspring of light is the sun. An accumulation of sun based cells are Solar panels. Numerous little sun powered cells spreading over a substantial territory can cooperate to give enough power. The more light that falls on the cell, the greater power is created. It was led about the most reasonable and powerful sun based boards on the Bulgarian market. A standout amongst the best offers dependent on quality, cost and modest transport were boards with: 3W, 5W, 10W, 20W, 40W, 100W, 130W, 175W, 260W. The shape and the spot they could be appended to involve building structure. Generally they are on the highest point of the rooftop so as to gather the most daylight and warmth.

### ➤ Water heating system

One more option for warming is utilizing the underground water. In the locale of Sofia there is a great deal of underground water. Beside a great deal of downpour water and water from liquefying ice is falling through the slant of the mountain Vitosha. In 2012 was manufactured an open structure in the local plot for "IKEA" Inc. Amid the looking over, engineers have discovered the nearness of underground water at a profundity of 56 meters. Water penetrating could be made, which will give high temp water amid the winter. The water source heat siphons work most effectively contrasted and land and air. The temperature of the surface soil layer at a profundity of 2m is moderately steady all year.

### ➤ Recuperator

A standout amongst the most vital techniques for making the detached house envelope is the Recuperator framework. The Recuperator is a warmth exchanger which plays out the recovery of warmth or cold air in the ventilations framework. In spite of the fact that it can essentially diminish the expense of power, the speculation cost is effectively returned on account of the decreased utilization of vitality cost and innocuous natural effect.

### III. OBJECTIVES

The main objective of this work is to introduce Green construction with sustainable management for environmental, social and economic benefits. And to achieve this, we project a methodology to deliver high performance green construction with sustainable project management by improved design, construction, operation, maintenance, and removal of waste materials. Through this proposed work we can reduce the overall impact on human health and the natural environment by the following ways:

- Using energy, water and other resources efficiently
- By reducing waste, Pollution and environmental degradation

### IV. PROBLEM STATEMENT

Development has been blamed for causing natural issues running from over the top utilization of worldwide assets both as far as development and building activity to the contamination of the encompassing condition, and research on green building structure and utilizing building materials to limit ecological effect is as of now in progress. Be that as it may, depending on the structure of a venture to accomplish the objective of maintainable advancement, or to limit impacts through proper administration on location, isn't adequate to deal with the present issue. The go for supportability evaluation goes considerably more distant than at the plan phase of an undertaking to think about its significance at a beginning period, before any point by point structure or even before a dedication is made to proceed with advancement. In any case, practically zero concern has been given to the significance of choosing all the more naturally benevolent plans amid the venture evaluation organize; the phase when ecological issues are best joined.

“Sustainable” or “green” buildings are designed and constructed with emphasis given to environmental, social, and economic priorities. Importantly, they emphasize long-term as well as short-term performance. However, high performance buildings place particular emphasis on building energy use and indoor environment quality. The U.S. Department of Energy (2004) defines high performance buildings as those (emphasis added) “with energy, economic, and environmental performance that is substantially better than standard practice. Their energy efficiency saves money and natural resources. The buildings are a healthy place to live and work for occupants and have a relatively low impact on the environment.”

The demand for high performance “green” or “sustainable” buildings is rapidly becoming the most significant trend in the building industry. As the Architecture, Engineering, and Construction (AEC) industry develops the strategies and technologies for these projects, an increased emphasis must be placed on the processes and competencies required to deliver high performance buildings.

### V. LITERATURE REVIEW

In examination of Yudelson (2007)[2] buildings on promoting systems for green structures focuses on the significance of imparting the estimations of the organization obviously and separate from its opponents. Further he included "The market for green structures is still so youthful that it would be sane for the organization to locate an unused position in the market and make it into its own. While seeking after this system, the organization ought to get solid proof, for example, building endorsements, to show its prevalence and maintainable activities". Void guarantees are never effective in drawing in long haul clients. The green building part is becoming worldwide and an ever increasing number of new organizations are entering the market.

Supportability in development offers first-rate reaction to the present ecological and financial issues as it is a use of the standards of economical improvement to the far reaching development cycle from the extraction of crude materials, through arranging, plan and development of structures and foundation, until their final deconstruction and the executives of the resultant waste (Yunus and Yang 2011) [3]. The principle challenge for the business is to have an indispensable influence in diminishing the effects of its exercises on the earth and neighborhood networks. Basically, how development in construction advancement procedure can be lined up with network improvement for long haul maintainability or to upgrade the neighborhood strength.

Sustainable network of communities utilizes its assets to address current issues while guaranteeing that satisfactory assets are accessible for who and what is to come. It looks for a superior personal satisfaction for every one of its inhabitants while keeping up nature's capacity to work after some time by limiting waste, counteracting contamination, advancing efficiency and creating neighborhood assets to rejuvenate the nearby economy. Among numerous activities, structuring vitality efficient and individuals well disposed structures is one of the critical parts of the manageable network of sustainable communities.

## VI. RESEARCH METHODOLOGY

For above concern of demand for high performance of green or sustainable construction we proposed a methodology and in this work we will focus on understanding all aspects of the sustainable project for green construction and its delivery of high performance with the help of established process-based theories and structured around a systematic methodology designed to minimize waste, maximize value, eco-friendly and reduce cost and project an integrated model for high performance delivery for sustainable green construction.

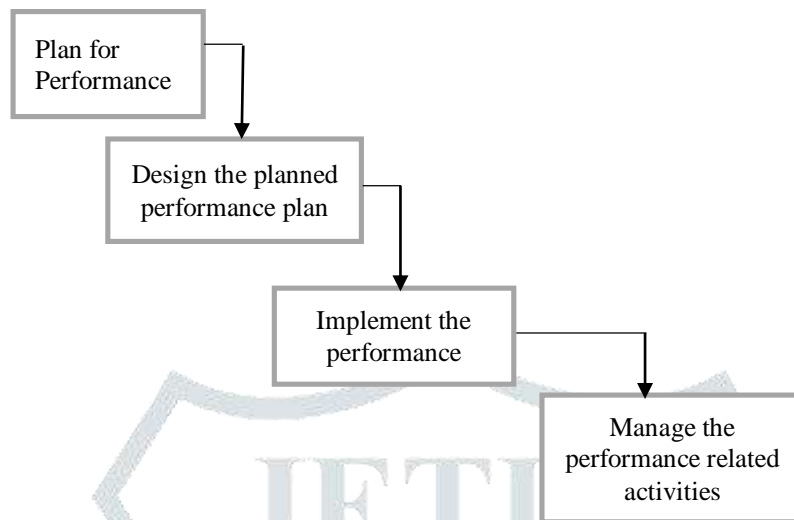


Figure 1: Proposed Architecture

For the performance attainment considering the sustainable construction like:

- user related parameters;
- physical environmental parameters;
- building related design parameters;
- legal parameters.

All this parameters related to each other and they should be taken into consideration depending on each other at the design stage. Moreover the designer restricted in the scope of his/her planning by the framework of related parameters such as

- social-cultural parameters;
- economical parameters;
- technological parameters.
- Physical Environmental Parameters

Physical environmental parameters are natural factors have a determining influence on the outdoor environment. They are beyond the control of the designer and must be considered with their given values. These parameters are;

- Outdoor air temperature;
- Solar radiation;
- Outdoor humidity;
- Outdoor wind velocity;
- Outdoor illumination level.

### ➤ Design Parameters

The built environment is defined as designed and constructed by man, and can be considered under different criteria of scale. The main design

parameters related to the built environment with an influence on the control of climate, light and sound, as well as energy conservation is given below:

- Dimensions and orientation of external obstacles;
- Solar radiation reflectivity of surrounding surfaces;
- Light reflectivity of surrounding surfaces;
- Soil cover, and nature of the ground (plant cover and groups of trees).

### ➤ Social-Cultural Parameters

The social-cultural parameters effected the form of buildings have some differentiations according to language, religion, family life, privacy, educational level, economical level, social structural differences, urbanization of the community.

### ➤ Economical Parameters

There is a continuous flow of resources, natural and manufactured, in and out of a building. This flow begins with the production of building materials and continues throughout the building’s life span to create an environment for sustaining human well-being and activities.

➤ **Technological Parameters**

As it is known technology can be described as a method or methodology used by human beings that applies technical knowledge or tools to create environment. Successful application of the sustainable design decisions depends on convenient technological strategies.

**VII. RESULTS AND ANALYSIS**

In the proposed work high performance project delivery is being considered with various performance parameters, for meeting the project requirements and needs IDEF<sub>0</sub> is being used. Where the model comprises of following steps:

- managing,
- planning,
- design,
- construction, and
- operation steps of the life cycle of a facility.

Green building projects are inherently different from their conventional counterparts from a technical perspective. They require the use of special materials and building practices to achieve sustainability. They can also require extensive documentation and reporting if environmental certification is a project goal. The unique characteristics of green construction require adjustments to traditional project management practices to minimize risks and improve the chances of delivering the project within acceptable costs. The majority of these adjustments reflect an increased need for cross-discipline coordination on-site selection, construction techniques and building systems and subsystems early in project life cycle.

Table 1: Parametric Evaluation.

S. No.	Analysis parameters	Traditional Method	Proposed methodology
1.	Schedule	Not available	Proper scheduling of the tasks
2.	Budget	Always over-run	Pre-defined
3.	Quality	Can be considered after completion	Can be detected at early phases
4.	Performance	Can be considered after completion	Can be detected at the end of every phase and also can be predicted at start.

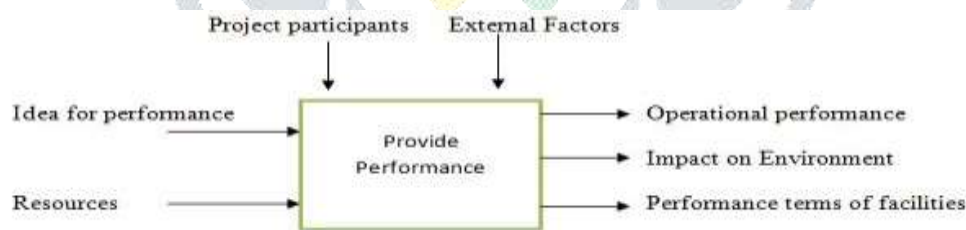


Figure 2: Performance layout of proposed methodology.

Table 2: Obstacle Consideration Analysis.

S. No.	Obstacles considered	Traditional Method	Proposed methodology
1.	Economic	Not considered	Proper analysis
2.	Social	Not Considered	Taken among primary steps
3.	Environmental	Not considered	Considered as major phase
4.	Political	Considered when occurs	Pre-consideration
5.	Governmental	Considered when occurs	Pre-Consideration

For the analysis of the various parameters for the green construction, the factors are narrowed with some single units as under: For the green construction the environment is of major consideration where the parameters like,

- Outdoor air temperature,
- Solar radiation,
- Outdoor humidity,
- Outdoor wind velocity,



- Outdoor illumination level,
- Impact on nature,

Are considered where some of the parameters are for the comfort ability issues related to the construction and some goes with environment.

The environment that the human beings are lived is directly effects the psycho- logical behavior of people. The open and close areas, the colour, shape, surface of the architectural elements and the light, sound and the amount of air that comes from the outer space is the major factor effects on the people psychology.

The social-cultural parameters effected the form of buildings have some differentiations according to language, religion, family life, privacy, educational level, economical level, social structural differences, urbanization of the community. In the design process, social-cultural parameters have also important role besides the other parameters mentioned before.

Budgets are typically developed by an architect based on a formula or unit costs, which can vary as much as 15% from actual costs. They are often created and expended with little consideration of future operating and maintenance costs, in the case of the traditional methods. While in the case of the proposed methodology the complete preconstruction estimates with input from the builder, project manager, architect, and real estate consultant. Estimating costs associated with specialized areas like green-building products require experience. The budget may also include an emphasis on life cycle costing, shifting focus from short-term return on investment (ROI) to long-term gains from operational savings.

### VIII. CONCLUSION

Greening project management practices can significantly improve the ability of a sustainable construction project to be delivered within acceptable cost constraints and other factors too. The benefits of the integrated design process are essential for the successful delivery of a cost-efficient green construction project. The integrated approach is successful in overcoming a challenge that has impacted development and construction for many years: splintered functional experts who struggle with communicating and collaborating as a team. Investment in sustainable construction will definitely take place on a far greater scale over the coming decades due to the promotion of sustainable development.

In the proposed methodology the proper justifications are made for the green construction that don't have impact over the environment, the degree to which certification is sought can dictate critical elements of the project, including site selection, design, costs, schedule, and documentation. Establishing design criteria will help communicate the project's goals and priorities to the project team in a measurable, technical form. The factors that initiate the performance of the project and also with great efforts for the factors like socio-economic, political, environmental, etc.

Although the objective of this paper has been achieved, there are some limitations. First, because of the limited time and space, this paper cannot cover all the sustainable construction practices and initiatives of every developed economy and international organization. Second, due to the limit of the search code, some studies and books that investigated sustainable construction project partly in their contents might be omitted. The work majorly focused on the basic parameters due to which the performance constraints can be maximized. The methodology contributed a lot towards the achievement of the high performance sustainable green construction of the buildings by considering the major obstacles in the construction.

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### X. REFERENCES

1. WCED (1987) Our common future. World Commission on Environment and Development, New York, Oxford Univ. Press.
2. Yudelson, J. (2007). The Keys to Marketing Green Building Design.
3. Yunus, R., & Yang, J. (2011). Sustainability criteria for industrialised building systems (IBS) in Malaysia. Procedia Engineering, 14, 1590–1598.