

Effect Of Green Environment on The Performance of The Employees

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Table of Contents

Contents

Abstract.....	4
Introduction.....	5
Research Problem.....	8
Research Significance.....	9
Research Questions.....	12
Research Objectives.....	13
Research Hypothesis.....	14
Research Model.....	15
Suggested Industry/Organization for Empirical Study.....	16
Methodology.....	17
Suggested Structure of Project.....	20
Research Onion.....	23
Literature review.....	25
Conclusion	38
References.....	40
Appendix.....	49

ABSTRACT:

While the natural advantages of green structures are proven and factual, the effect on representative prosperity and execution stays a functioning area of exploration. This study examines the expected connection between green structure plan and practices, and representative execution measurements in the working environment. This research intends to decide if green structures quantifiably affect worker execution markers like efficiency, non-appearance, and occupation fulfilment. An insert picked research strategy, e.g., field study system will be utilized. Information will be gathered from representatives working in both green-ensured and ordinary places of business. Representative execution information will be accumulated through overviews, self-announced measurements (e.g., presenters logs), or organization records (e.g., efficiency information). Moreover, data with respect to the green structure highlights and ecological quality (e.g., air quality, temperature, light levels) of the explored structures will be gathered. Measurable examination will be led to distinguish connections between green structure elements and worker execution information. Potential frustrating factors, for example, work type, work culture, and representative socioeconomics will be represented. This exploration is supposed to add to a developing collection of information on the connection between green structures and human execution. The discoveries can possibly illuminate building configuration rehearses, authoritative direction, and at last, representative prosperity and efficiency. Catchphrases: green structures, representative execution, efficiency, truancy, work fulfilment, maintainability

INTRODUCTION:

Natural change is a problem of the climate. Changes in the environment are primarily influenced by humans and natural ecological processes. As per the World Wellbeing Association, environmental change, ozone exhaustion, changes in biological systems, changes in hydrological frameworks, and the arrangements of freshwater, land debasement, urbanization, and weights on food-delivering frameworks are the worldwide ecological risks that impact to human wellbeing. Then again, an Earth-wide temperature boost and exhaustion of regular assets can't be dismissed. The Unified Countries Climate Program started to utilize the idea of "green economy" in the year 2009. **(WHO, 2018).**

In this way, the Worldwide Green New Arrangement, and the Association for Financial Collaboration and Advancement utilized the expression "green development". Be that as it may, in the year 2012, the World Bank had made the green idea official with "green and comprehensive development". A "green business" is one more related idea and it is featured that an association utilizes inexhaustible assets and considers itself responsible for the human asset part of their exercises Today, it is fundamental for move towards feasible strategic policies than any time in recent memory, due to the adverse consequences experienced because of the ecological changes. **(Chen and Chang, 2013)** As per the on-going setting on the planet, the greater part of the associations is attempting to embrace green practices. Be that as it may, improper green practices can be recognized among associations. Then again, restricted organizations that are committed to further developing green practices can be distinguished in various nations. With the developments of the financial climate, green practices will be a

significant period of the Human Asset The board (HRM). **(North, 1997)** Green Human Resource Management (GHRM) is an area of potential research in developing and emerging nations. Moreover, there could be no appropriate approach to gathering green practices related information in various nations. Subsequently, studies with respect to the green preparation are fundamental, and the discoveries of those reviews will help to make strategies as well as to make an arrangement of their endeavour working towards the ecological strategy. **(Opatha &Nawaratne, 2016).**

As a whole, it will serve as a resource for learning about how an organization's social responsibility affects the environment. GHRM is the utilization of HRM procedures to energize manageable utilization of assets inside business associations. It supports environmentalist ideals. Green preparation and improvement rehearses on the worker disposition towards their presentation should be visible as a missing perspective from the administration of associations. This examination centres around the issue of 'what is the impression of green preparation and advancement rehearses on representative execution among labourers?'. **(Jenny & Xin, 2016)**

In view of this foundation, the overall goal of this study was to distinguish discernments about green preparation and improvement rehearses on representative execution among work. How to strike a balance between economic growth and sustainable development is the world's greatest challenge today. GHRM is an answer for this. GHRM allows better-quality representative awareness and focuses on the manageability of the climate. In view of writing surveys, it shows that an expansive cycle to approach reference for GHRM still can't seem to arise. Giving natural preparation to the authoritative individuals to foster required abilities and information is a significant capability of GHRM. Likewise by giving natural schooling that in a difference in

conduct among supervisors and non-administrative workers is required inside the associations. Improvement of both green unique capacities and green ground breaking initiative is helpful primer highlights further develop green item advancement execution. A review has shown that GHRM factors including green enrolment, green preparation and improvement and green learning on firm execution essentially influence the presentation of the firm **(Bhutto & Aurazeb, 2016)**.

RESEARCH PROBLEM:

This study centers around concentrating on non-private places of business to grasp the effect of the board mediations on tenants' ways of behaving and, thusly, on their exhibition. Focusing on non-private structures as a particular structure typology to decide energy utilization in green structures was first featured by a report drove by creators. The structure life cycle represents over 40% of asset use, alongside the structure's creation, activity and upkeep. The groundwork of green structure configuration depended on worries about a lot of waste and the high-energy utilization that happens during the existence pattern of tall structures. The increasing expenses for energy and garbage removal are probably going to effect on planners who, thus, are trying to embrace a more reasonable plan technique in the fabricated climate industry. Albeit numerous sorts of green structures exist, for example, schools, medical services, private and retail, this review centers around places of business. **(Bhutto & Auranzeb, 2016).**

While illustrations can be gained from other structure typologies, limiting the degree to the place of business will dispose of any extra components that could impact the outcomes. Moreover, it is trying to connect with associations situated as multi-occupants in business green structures. These difficulties remember contrasts for their interest arrangements, levels of activity and upkeep, and needs for further developing ways of behaving and connections because of the non-presence of proprietorship. The multi-occupant point of view is past the extent of this study which centers on associations' mediations to help worker ways of behaving bringing about superior execution in green structures. **(Chen and Chang, 2013)**

RESEARCH SIGNIFICANCE:

The examination into the effect of green structures on worker execution conveys huge load for both down to earth and hypothetical reasons:

Functional Importance:

Economic benefits: Businesses will see an increase in profits as a direct result of decreased absenteeism, increased employee retention, and increased productivity. Evaluating these enhancements through exploration will give substantial proof to organizations to legitimize interests in green structures. **(Chen and Chang, 2013)**

Benefits to society as a whole: a happier and healthier workforce is a direct result of improved employee well-being and reduced stress. **(Slovik, 2013)**

Benefits for the environment: By reducing energy, water, and carbon emissions, green buildings mitigate climate change and its effects and promote sustainability. **(Jenny & Xin, 2016)**

Hypothetical Importance:

Acquiring an understanding of the mechanisms:

Research can delve deeper into the specific mechanisms by which employee performance is improved in green buildings. This could incorporate concentrating on the effect of further developed air quality, regular light openness, admittance to nature, and bio-philic plan on mental capability, feelings of anxiety, and inspiration.

Generalizability:

While existing exploration proposes beneficial outcomes, further investigations are expected to evaluate the generalizability of these discoveries across various kinds of work environments, work jobs, and social settings. **(Slovik, 2013)**

Improving plan:

Exploration can illuminate the ideal plan regarding green structures that boost their positive effect on representative execution, taking into account factors like space use, innovation combination, and individual inclinations. **(North, 1997)**

Policy development:

Government policies and building regulations can be influenced by solid evidence to encourage green building practices, resulting in broader societal benefits.

Generally speaking, research in this space holds the possibility to:

- **Give a convincing business case to green structures:** By measuring the monetary advantages, exploration can convince organizations to put resources into supportable working environments.
- **Guide the plan of viable green spaces:** Understanding the components and ideal plan standards can prompt working environments that amplify representative prosperity and execution. (Slovik, 2013)
- **Add to a more maintainable future:** By advancing green structure rehearses, exploration can assist with relieving environmental change and establish a better climate for everybody. To realize this strategy's full potential for individual businesses and society as a whole, further research into the relationship between green buildings and employee performance is essential. (Opatha &Nawaratne, 2016).

The concept of green buildings has gained significant traction in recent years. Green buildings are designed and constructed with a focus on environmental sustainability, minimizing their impact on the environment throughout their lifecycle. This includes features that promote energy efficiency, water conservation, and the use of sustainable materials. While the environmental benefits of green buildings are well-documented, the impact on employee performance is an area of ongoing research. This study aims to investigate the potential link between green building features and employee performance, exploring whether these sustainable workplaces enhance employee well-being, productivity, and overall satisfaction.

RESEACH QUESTIONS:

1. To what extent do green building features (e.g., natural light, improved air quality, access to green spaces) influence employee well-being (e.g., reduced stress levels, improved sleep quality)?
2. How does working in a green building impact employee productivity (e.g., absenteeism, task completion rates, meeting deadlines)?
3. Does employee satisfaction with their work environment differ between occupants of green and conventional buildings?

RESEARCH OBJECTIVES:

The primary objective of this research is to explore the relationship between green building features and employee performance. This will be achieved by:

- Identifying key green building features and their potential benefits for employee well-being and productivity.
- Investigating the impact of these features on employee outcomes through a combination of quantitative and qualitative data collection methods.
- Analyzing the data to determine if there is a significant correlation between green buildings and improved employee performance.
- Providing insights for companies and organizations considering the adoption of green building practices, highlighting the potential benefits for both environmental and business performance.

RESEARCH HYPOTHESIS:

H1: Employees working in green buildings will report higher levels of well-being compared to those working in conventional buildings.

H2: Employees in green buildings will demonstrate higher levels of productivity compared to those in conventional buildings.

H3: Employees working in green buildings will express greater satisfaction with their work environment compared to those in conventional buildings.

RESEAECH MODEL:

This research will utilize a causal-comparative design. Data will be collected from two groups:

Group 1: Employees working in green buildings certified by a recognized green building standard (e.g., LEED)

Group 2: Employees working in conventional office buildings that are not green-certified

We will measure employee well-being, productivity, and satisfaction through a combination of methods:

Surveys:

Standardized questionnaires will be administered to collect data on employee well-being (e.g., perceived stress levels, sleep quality), productivity metrics (e.g., self-reported absenteeism, task completion rates), and satisfaction with the work environment (e.g., building features, air quality, comfort).

Focus Groups:

- Holding focus group discussions with a smaller sample of employees from both groups can provide deeper qualitative insights into their experiences working in their respective environments.
- By comparing data from the two groups, we can assess whether green building features are associated with positive changes in employee well-being, productivity, and satisfaction.

SUGGESTED INDUSTRY/ ORGANIZATION FOR EMPIRICAL STUDY:

Target Industry: The initial study could focus on a specific industry known for knowledge work and sedentary office environments, such as:

- Technology companies
- Financial services firms
- Professional service firms (e.g., accounting, law)

Target Organization: An organization with a mix of green-certified and conventional office buildings within the chosen industry would be ideal.

METHODOLOGY:

1. Research Philosophy: Interpretivist

An explanatory philosophy is in line with this research issue since it aims to comprehend how employees see and feel working in green buildings. Because these are subjective sensations best understood through an explanatory lens, our goal is to investigate how green aspects affect people's well-being, productivity, and overall performance.

2. Research Approach: Inductive

We will Use an inductive method to gain a deeper knowledge of how green buildings affect performance, beginning with staff experiences and observations. This makes it possible for us to spot new themes and connections that might not be immediately obvious when using a preconceived notion.

3. Research Strategy: Mixed Methods

A mixed-methods approach will be used to gain a comprehensive understanding of the topic. This will involve:

- **Quantitative data:** Conducting a survey with employees from green and non-green buildings to gather data on factors like employee well-being, productivity metrics, and absenteeism.
- **Qualitative data:** Conducting semi-structured interviews with a smaller group of employees to delve deeper into their personal experiences and perspectives on working in green buildings.

4. Research Choice: Mixed Methods

As mentioned above, a mixed-methods approach is chosen. Quantitative data provides objective measurements of performance, while qualitative data allows employees to express their lived experiences and perceptions. Combining both methodologies creates a richer and more nuanced picture of the impact of green buildings.

5. Time Horizon: Cross-Sectional

This initial study is probably going to use a cross-sectional design. We will be able to compare employee experiences and performance from green and non-green facilities since data will be gathered all at once. Future studies, however, might take into account a longitudinal design to monitor the long-term effects of green buildings on worker performance.

6. Data Collection and Analysis Techniques:

Quantitative Data:

- An electronic version of a standardized survey will be created and given to staff members.
- To compare performance measures between groups operating in green and non-green facilities, data analysis will entail statistical approaches including calculating means, standard deviations, and correlations.

Qualitative Data:

1. Semi-structured interviews will be carried out with a reduced number of workers from both kinds of structures.
2. To find reoccurring themes and patterns in employee experiences and impressions of their workplace, thematic analysis will be employed.

3. These methods of data gathering and analysis when combined allow us to fully comprehend the effects of green buildings on worker performance.

SUGGESTED STRUCTURE OF PROJECT:

This structure outlines a research plan to investigate the impact of green buildings on employee performance. It can be adapted in order to fit the specific needs and resources of the study.

1. Literature Review

- **Writing about the Green Building Practices:** Characterize and investigate various parts of green structure plan and development. This could envelop energy productivity, asset protection (water, materials), indoor ecological quality (lighting, air quality, acoustics), and biophilic plan (association with nature).
- **Employee Performance:** Distinguish and characterize important measurements for worker execution in your review. Normal measurements incorporate efficiency, non-attendance, work fulfillment, mental capability, and inventiveness.
- **Existing research:** Lead an intensive survey of existing examination on the association between green structures and representative execution. Search for concentrates on that lay out a causal relationship and distinguish likely systems through which green structures could impact execution.

2. Research Plan

- **Research Question:** Form a particular exploration question that tends to the effect of green structures on representative execution. This question ought to be clear, brief, and quantifiable.
- **Research Strategy:** Pick an examination technique that best suits your assets and exploration question. Here are a few likely methodologies:

Field Study: Think about representative execution in green and traditional places of business. This could include reviews, efficiency information examination, and natural checking.

Lab Investigation: Establish a controlled climate to detach the impacts of explicit green structure highlights on worker execution.

Case Studies: top to bottom assessment of a solitary green structure project, investigating its effect on representative prosperity and execution.

Overview Exploration: Circulate studies to workers in green and traditional structures to survey their experience and execution.

3. **Information Assortment Worker Information:** Accumulate information on representative execution through studies, self-announced measurements (e.g., presenters logs), or organization records (e.g., efficiency information).
4. **Building Information:** Gather data on the green structure highlights and ecological quality (e.g., air quality, temperature, light levels) of the explored structures.

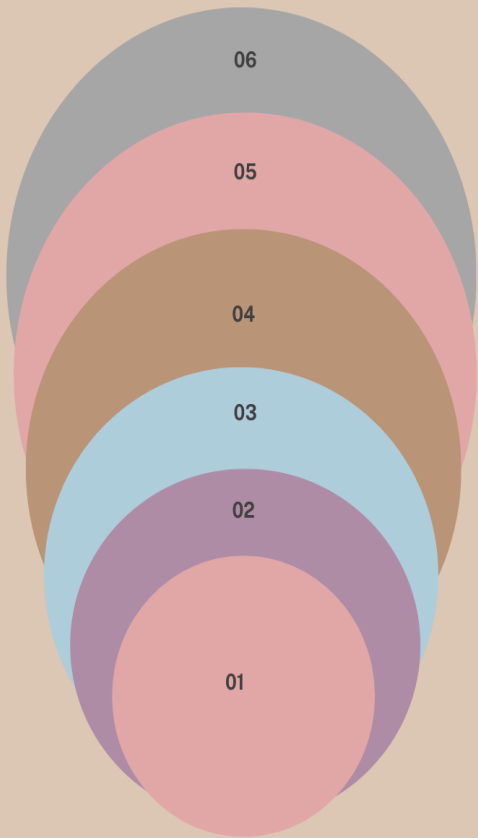
Control Factors: Distinguish and represent potential perplexing factors, for example, work type, work culture, and worker socioeconomics.

5. **Information Investigation:** Dissect the gathered information utilizing fitting factual techniques to decide whether there is a huge relationship between green structure elements and representative execution. Consider directing subgroup examinations to look at on the off chance that the effect of green structures differs relying upon representative socioeconomics or work type.

6. **Discussion and conclusion:** Decipher discoveries with regards to the current exploration and impediments of your review. Talk about the ramifications of exploration for building configuration rehearses representative prosperity, and in general hierarchical execution. Distinguish regions for additional examination to reinforce the comprehension of the connection between green structures and representative execution.
7. **Cost-Benefit Analysis:** While your essential center may be execution, consider including money saving advantage investigation to survey the expected monetary benefits of green structures corresponding to representative prosperity and execution upgrades. Longitudinal Review: In the event that assets permit, consider a longitudinal report plan to follow the drawn out effect of green structures on representative execution over the long haul.

This construction gives a structure to concentrating on the effect of green structures on representative execution. Define and explores different aspects of green building design and construction. This could encompass energy efficiency, resource conservation (water, materials), indoor environmental quality (lighting, air quality, acoustics), and biophilic design (connection to nature).

RESEARCH ONION



01 RESEARCH PHILOSOPHY
INTERPRITIVISM

02

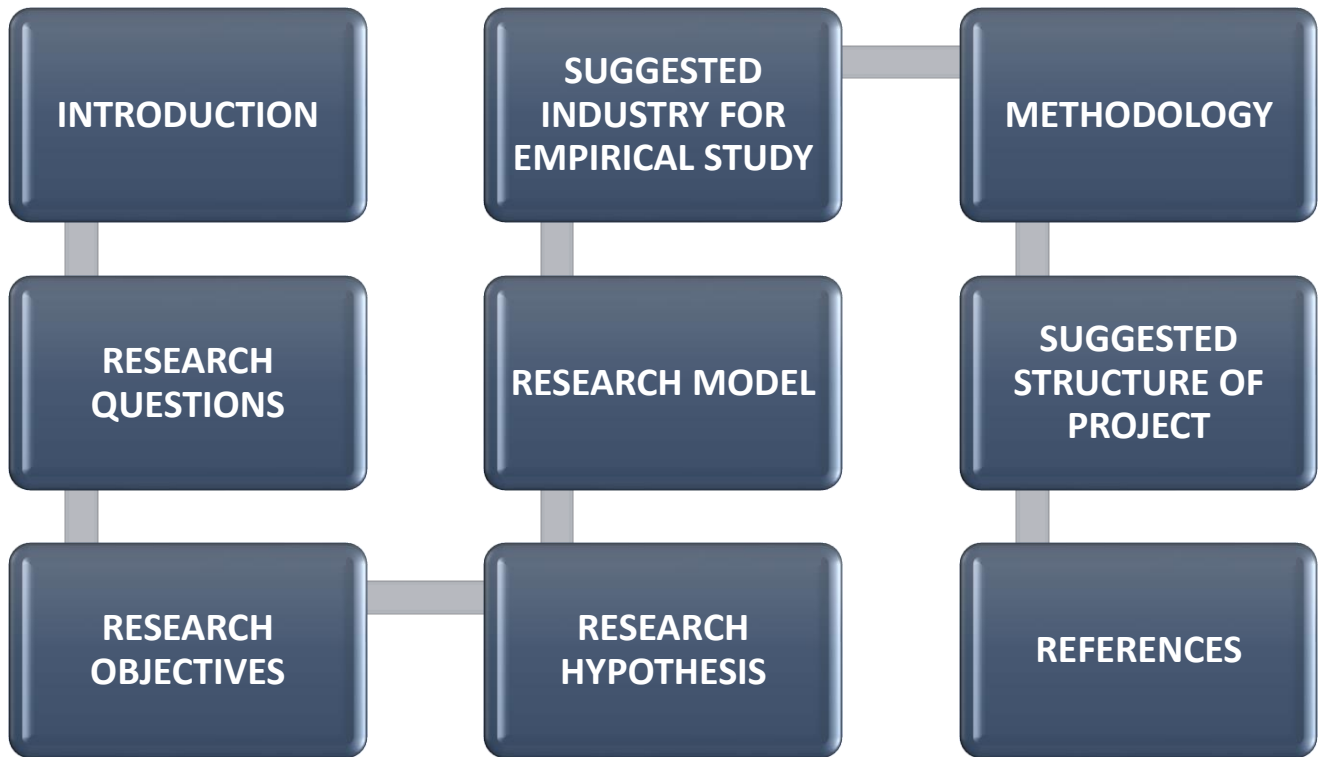
RESEARCH APPROACH
INDUCTIVE

03 RESEARCH STRATEGY
MIXED METHODS
Surveys and Case studies

04 RESEARCH CHOICE
MIXED METHODS

05 TIME HORIZON
CROSS-SECTIONAL

06 DATA COLLECTION & ANALYSIS TECHNIQUES
SURVEYS AND CASE STUDIES



Review of the Literature:

Each building works unequivocally or verifiably in view of how tenants act and answer (**Day and O'Brien 2017**). Likewise, the generally speaking natural advantages of green structures rely upon tenants' ways of behaving (**Wener and Carmalt 2006**). The actual parts of the structure give offices and space in which to live and work. Subsequently, these structures are intended to oblige the conduct, social and mental requirements of tenants. In this manner, it is essential to comprehend and foresee what exercises are expected to understand the maximum capacity of green structure plan. From the specialized point of view, architects and creators guarantee that energy and waste are minimized. Explicit human way of behaving basically decides the proficient utilization of these assets (**Wener and Carmalt 2006**).

Nonetheless, explicit mental and social issues limit the specialized and affordable arrangements given by green structures (**Hoffman and Henn 2008**). For instance, tenants could save energy when they are inside the structure. As **Day and Gunderson (2015)** expressed, when energy use is recorded as higher during non-working hours, this is most likely because of representatives leaving lights and hardware on even subsequent to completing work. In another model, inhabitants settle on conduct decisions to augment their own solace by utilizing unnatural light sources rather than regular day lighting hotspots for which the structure was planned (**Wener and Carmalt 2006**). These models are important for tenants' social issues that fundamentally shift the proficiency of green structures. The need of associations by tenants with the green elements of green structures is frequently impacted by their absence of information and data about the structures (**Day and Gunderson 2015**). A few scientists have would in general form

how they might interpret these issues through tenants' reactions in which they rate their fulfillment through conduct input (**Heerwagen 2000**).

For any originator, tenants' fulfillment and wellbeing are convincing drivers for informed choices. Be that as it may, the main detour in considering an tenant conduct technique in maintainable plan arrangements is the gigantic inter-individual contrasts between tenants (**Wang et al. 2018; Cena and De Dear 2001; Haldi and Robinson 2011**). The insights and, subsequently, the way of behaving of inhabitants are probably going to be profoundly factor and flighty. This is the fundamental area of concern; furthermore, architects frequently gripe that they can't accomplish great ecological quality since they have zero control over every tenant's way of behaving (**Paul and Taylor 2008**). From this point of view, the tenant situated plan process is a discussed subject, particularly at the point when creators may not be thinking about the inclinations and necessities of each tenant. While the representatives that working in their workplaces are not in charge or answerable for their current circumstance, they are more anxious (**Paul and Taylor 2008**). Subsequently, their exhibition, for example, efficiency and prosperity, at work may be most affected. Following this line of contention, workers' natural way of behaving at the working environment ought to consolidate both in-job and extra-job execution as a commitment to and production of significant worth for associations (**Ramus and Steger 2000**). Notwithstanding, representative ways of behaving for anticipating execution are to a great extent subject to the association's drives and practices.

Green buildings are becoming more and more commonplace in offices because of their emphasis on occupant well-being and environmental sustainability in their design. This change is being

driven by rising awareness of the benefits that green buildings may provide for worker satisfaction, health, and performance in addition to environmental concerns. The present study scrutinizes the extant literature concerning the correlation between green building attributes and employee performance, delving into the plausible processes that may underlie these associations.

Enhanced Quality of Indoor Environment (IEQ):

The emphasis that green buildings have on enhancing interior environmental quality (IEQ) is among its most well-known advantages. This covers things like improved ventilation, more natural light availability, improved thermal comfort, and lower noise levels. Research has indicated that higher IEQ can result in a number of advantageous consequences for workers, such as:

Enhanced cognitive function:

Fisk (2000) conducted research and discovered that there is a strong correlation between higher ventilation rates in office buildings and workers' increased capacity for memory, decision-making, and typing. **(Fisk, W. J. (2000)).**

Decreased presenters and absenteeism: Research indicates that there is enhanced thermal comfort and air quality in green buildings that may contribute to a drop in sick leave among the employees. Moreover, **(Singh et al., 2010)** gave a review of the literature on the effects of indoor environmental quality (IEQ) on building inhabitants' health, well-being, and productivity.

Indoor and Built Environment: Furthermore, there's a chance that workers won't be as likely to miss work due to illness or discomfort (presenters).

Enhanced satisfaction and well-being of employees: By lowering tension, weariness, and headaches, there will be an improved IEQ that can help employees feel better about themselves. In **(Park et al., 2014)** a study on the connection between worker wellbeing and indoor environmental quality in buildings with green certification is also given thoroughly.

Building and Environment: Workers in green buildings expressed greater levels of satisfaction with their work environment than those in conventional buildings, according to a study by **Heerwagen et al. (2000)**. A thorough literature review and conceptual framework for the salutogenic workplace are also provided.

The advantages of green design for psychology:

Green buildings frequently use design components that go beyond air quality and physical comfort. Some examples include having access to natural views, incorporating natural aspects into designs, and providing more possibilities for physical activity. These characteristics may significantly affect an employee's mental health, which could result in:

Enhanced problem-solving and creativity: Research indicates that being in nature can improve both cognitive function and creative thinking **(Van Den Berg et al., 2010)**. There is also a review of the data regarding the health advantages of green workspaces which is given in the journal of Environmental Psychology, 30(4), 189-196. Through the creation of a more engaging

and dynamic work environment, bio-philic design features can also help foster creativity and problem-solving skills.

Access to nature and exposure to daylight have been related to lower levels of stress and happier moods (**Ulrich et al., 1991**). Stress recovery follows the exposure to natural settings. Stairs above elevators are one example of a green building design that encourages physical exercise and can help reduce stress and improve mental health.

Increased worker engagement and output:

Workers are more likely to be engaged and productive if they are happy, healthy, and feel at ease in their workplace. Research indicates that incorporating green building elements into a workspace can boost worker enthusiasm, teamwork, and total output (**Browning, et al. 2014**).

Investing in healthy places:

There are economic and social benefits of dispersed green infrastructure. In order to expand on the understanding of management's involvement, systematic assessment of studies are also done by other authors that focus on productivity and well-being in green buildings to identify a research need. The systematic review's main goal is to examine the body of research on two important effects of green buildings: well-being and productivity. The research boundary for this study is clearly defined by the systematic literature review.

Because of its potential benefit to both environment and their residents, green buildings have gained attention in the field of built environment. Comprehending the three interconnected

concerns linked to the impacts of green buildings is crucial (**Eichholtz, Kok, & Quigley, 2010**). The first problem is the goods, which include the components, the framework, and the controls needed to obtain any type of certification for green buildings. The second concern relates to people, or the various parties involved, including the government, financiers, designers, engineers, landlords, owners, and workers. The third concern relates to the procedures or results—maintenance, performance, and management, for example. To better comprehend how and to what extent green buildings affect their tenants, this section clarifies these three topics. This section also covers the potential of green buildings, the stakeholders engaged, and the background of green buildings.

Given that green buildings can promote sustainability, there is a clear international interest in researching green buildings. Thus, governments, the built environment sector, private businesses, and the general public all support green construction initiatives (**Zuo and Zhao 2014**). The terms "green buildings" and "sustainable buildings," as well as "high-performance buildings," "energy-efficient buildings," "low-carbon buildings," "high-quality buildings," and "intelligent buildings," are frequently used in conjunction with one another when discussing buildings (**Kozusznik et al. 2019**). All of these concepts are referred to as "green buildings" in this thesis. There is ambiguity in the definition of green buildings (GBs) (**Zuo and Zhao 2014**). According to **USEPA (2016)**, a green building is one that is planned with well-considered architecture and procedures that minimize resource use throughout the building's life cycle. A green building is one that minimizes waste, maximizes day lighting, recycles and reuses resources, and has a high interior environmental quality (IEQ) (**Kibert 2016**).

According to a different definition provided by the World Green Building Council (**WGBC 2017**), green buildings have the potential to completely replace conventional structures because of their remarkable capacity to significantly lower carbon emissions from the building process. **Dwaikat and Ali (2016)** defined a green building as an environmentally conscious commercial space that consumes fewer natural resources during construction and operation. Another way to define a "green building" is one that is certified green by an organization that certifies green buildings or that is built and maintained in compliance with any set of rules, regardless of whether the building is brand-new, remodeled, or already existing (**Wener & Carmalt 2006**). Although definitions differ, they all come to the same conclusion: a building can be considered "green" if it strives to be resource-efficient and supports a healthy ecology.

A rating of some kind is one of the typical requirements for a building to be considered "green." With the introduction of the Building Research Establishment Environmental Assessment Methodology (**BREEAM**) in 1990, green building certification began to take shape (**Gowri 2004**). Several green building grading systems have gained popularity in some nations throughout the past 20 years. Several green building certifications are available, such as the Comprehensive Assessment, Promise in Finland, ECO-PRO in Germany, and Leadership in Energy and Environmental Design (LEED) in the United States.

System for Built Environment Efficiency (CASBEE) in Japan, Athena in Canada, LEED India and Green Rating for Integrated Habitat Assessment (GRIHA) in India, Green Star in South Africa, and Green Star and National Australian Built Environment Rating System (NABERS) in

Australia and The Hong Kong Building Environmental Assessment Method (HK BEAM) in China.

Various nations have various construction codes. The majority of the debate in this study, which examines green buildings in Australia and India, focuses on contrasting Australia's Green Star which was introduced in 2003 and India's NABERS (introduced in 2000) rating systems with India's LEED (1993) system. The LEED and Green Star or NABERS are not interchangeable from the beginning. Nevertheless, in an idealized situation, a Platinum LEED building would be compared to a six-star building, a Gold LEED building to a five- or four-star building, a Silver LEED building to a three-star building, and a certified LEED building to a one- or two-star building **(BRE 2008)**. Global leadership is associated with six-star buildings, Australian excellence is associated with five-star buildings, best practice is associated with four-star buildings, good practice is associated with three-star buildings, average practice is associated with two-star buildings, and minimum practice is associated with one-star buildings **(GBCA 2009)**. Similar to this, the NABERS grading system uses a five-star tool; a five-star rating denotes outstanding building performance, a four-star rating indicates strong and excellent performance, and a three-star rating denotes very good performance.

A structure should meet specific prerequisites to be thought of "green," incorporating being evaluated here and there. The Structure Exploration Foundation Ecological Evaluation Technique (BREEAM) was the impetus for the ascent of green structure confirmation in 1990 **(Gowri 2004)**. In specific countries, various green structure rating frameworks have acquired prominence over the course of recent years. LEED in the US (USA), Commitment in Finland,

ECO-Genius in Germany, the Thorough Evaluation Framework for Constructed Climate Proficiency (CASBEE) in Japan, Athena in Canada, the Hong Kong Building Natural Evaluation Technique (HK Pillar) in China, LEED India and Green Rating for Coordinated Living space Evaluation (GRIHA) in India, Green Star in South Africa, and Green Star and Public Australian Fabricated Climate Rating Framework (**NABERS**) in Australia are a couple of these green structure certificates. Each nation has a different construction law.

Like other rating frameworks, the NABERS rating framework depends on a five-star framework: five stars signify extraordinary structure execution; four stars show great and solid execution; three stars demonstrate generally excellent current market best practices; two stars demonstrate normal structure execution; and one star means insufficient energy the board or obsolete frameworks (**NABERS 2019**).

Several of these accreditations, when applied to proficient settings, award credits as indicated by specific rules:

- the area of the structure's development;
- the biological equilibrium of the building site both during and after development;
- the utilization of water-and energy-effective materials;
- And the decrease of waste connected with sewage and refrigerants.

Xiong et al. (2015); Altomonte et al. 2019; Arif et al. 2016; Steinemann, Wargocki, and Rismanchi 2017) is a list a couple of parts of this tool compartment that incorporate recognizing great IEQ, which underlines better utilization of day lighting, outside sees, warm solace, natural air course, and diminished poisons. These instruments are essentially used to survey how well

the assembled climate can fulfill manageability guidelines by giving pointers to future development. As per **Ehrholtz, Kok, and Quigley (2013)**, partners embrace these deliberate rules to progress and carry out their green structure configuration approach. The various 37 examinations on green structures feature the specialized parts of these authentications as qualifying advantages of green structures. The tendencies and activities of those incorporating these angles are as yet indistinct (**Ding and YifeiZou 2016**).

Beyond a Snazzy Trademark:

The Crucial Role of Green Buildings in Employee Performance and Prosperity:

A sound workplace is crucial for employee efficiency and prosperity. Green buildings are at the forefront of this concept. By prioritizing sustainability, these eco-friendly structures offer numerous benefits beyond just bringing down fossil fuel emissions; they also significantly impact your employees' daily routines at work. Green buildings are essentially designed with an emphasis on environmental concern, air quality standards, and energy efficiency (**Von Paumgarten, 2003**). However, choices that seem exclusively ecological can also greatly affect your employees' satisfaction, well-being, and productivity.

The Performance Lift:

Since green workplaces incorporate better air quality, more natural light, and outside views, they have been associated with significantly higher levels of cognitive function. According to a **Harvard T.H. Chan School of Public Health review**, workers in green, well-ventilated work areas outperformed those in conventional workplaces on cognitive ability tests by 61% (**Allen et al., 2015**). Put another way, eco-friendly workspaces are more than just "good-to-haves." They

play an essential role in improving daily experiences for your staff members and empowering better performance. Now, let's investigate a few specific ways that green buildings can contribute to your team's efficiency and prosperity:

Upgraded Air Quality:

Green buildings promote a superior indoor climate by emphasizing efficient ventilation systems and reducing indoor contaminants **(Thatcher & Milner, 2012)**. By bringing down common health complaints including headaches, fatigue, and respiratory problems associated with "Sick Building Syndrome," these standards can reduce absenteeism and increase overall productivity **(Singh et al., 2010)**.

Better Lighting:

Designs for eco-friendly buildings often take full advantage of natural light **(Miller et al., 2009)**. As well as saving energy, this also makes the workspace more aesthetically pleasing, which further improves mood and reduces eye strain – two factors that significantly affect productivity **(Sathaye et al., 2012)**.

Temperature Control:

Office spaces with green elements have more efficient heating and cooling systems, which result in comfortable temperature ranges **(Browning et al., 2014)**. The ideal temperature range for human performance was found in a study led by Lawrence Berkeley National Lab **(cited in Ries et al., 2006)**. Any deviation from this range might cause discomfort and diminish output. Overall, transitioning to a comfortable workspace is a significant investment in your employees'

productivity and well-being, as well as aiding the climate. A satisfied and healthy employee is, after all, a productive employee.

The Advantages of Natural Lighting for Expanding Employee Efficiency:

Natural light affects how productive employees are. There's more to it than what might be expected; it goes beyond simply lighting up the workspace. Let's explore how this pivotal part of sustainable design could increase workplace effectiveness **(Miller et al., 2009)**.

There are various benefits to moving back from artificial lighting and embracing the wonderful sun. The idea behind this is simple yet significant: the more we utilize natural light, the less we require artificial light, which saves energy as well as offers various health benefits **(Park et al., 2014)**. Exposure to sunlight, most importantly, contributes to the maintenance of our circadian rhythms, which are internal body clocks that control our sleep-wake cycle. The ideal light for our bodies actually comes from the sun, as we evolved under its rays **(Van Den Berg et al., 2010)**. Employees who have a sufficiently bright workstation with plenty of natural light are better able to stay asleep throughout the night and are thusly more alert and productive during the workday **(Browning et al., 2014)**.

Second, vitamin D, which is fundamental for immune system function, bone health, and even mood regulation, is abundant in sunlight. Regular exposure to daylight during working hours can bring vitamin D levels up in employees, which will help their overall health and well-being **(Allen et al., 2015)**.

In the realm of design, it's said that "light is the first of the paintbrushes on the palette." While examining natural light in the workplace, this couldn't be truer **(Miller et al., 2009)**. It changes

the aesthetic appeal while also creating the impression of a happier, healthier, and more effective workplace. Additionally, a study completed by Northwestern University's Interdepartmental Neuroscience Program in Chicago found that a worker's efficiency rose in direct proportion to their exposure to daylight, which also improved their personal satisfaction and sleep patterns **(Miller et al., 2009)**. Likewise, natural light has a relaxing influence that decreases stress in the workplace. It diminishes headache occurrence and eye fatigue, which brings down absenteeism.

CONCLUSION:

Green structures can essentially upgrade representative execution in more ways than one. Further developed indoor air quality, accomplished through better ventilation and filtration frameworks, can prompt more keen concentration, decreased respiratory issues, and fewer days off. Vital utilization of normal light can support worker mind-set, energy levels, and in general prosperity. Also, green structure includes that associate inhabitants with nature, similar to admittance to plant life and patios, can additionally diminish pressure and work on mental capability. By establishing better and more agreeable workplaces, green structures can possibly open huge upgrades in representative efficiency, imagination, and in general fulfillment.

Green structures hold the possibility to change the work environment climate, encouraging natural supportability as well as representative prosperity and execution. This exploration proposition researches the effect of green structure plan and practices on worker execution. By directing a [insert picked research strategy, e.g., field study] contrasting representative execution in green and regular places of business, this exploration expects to recognize a likely causal connection between green structure highlights and worker measurements like efficiency, truancy, and occupation fulfillment. Understanding these connections can be significant for building originators, engineers, and organizations trying to make work areas that advance both ecological obligation and representative prosperity. The discoveries of this exploration can add to the developing assemblage of information on the effect of green structures on human wellbeing and execution. Eventually, this examination endeavors to educate the plan and development regarding future work environments that are manageable as well as upgrade representative

execution and prosperity, prompting a mutually beneficial arrangement for both the climate and the labor force.

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APPENDICES:

Overview Inquiries for Green Workplaces and Representative Execution:

General Discernment:

- How fulfilled would you say you are with the general green components in your office climate (e.g., normal light, plants, admittance to nature)?
- How much do you accept green components in your office add to your prosperity and generally speaking solace?
- Do you feel that green elements in your work area decidedly affect your capacity to concentration and concentrate?

Explicit Green Components:

- How much light comes from the sun in your workspace?
- Does it influence your mind-set or efficiency?
- Are there plants integrated into your office climate?
- Do they have an effect as far as you can tell?
- Do you approach open air spaces or perspectives on nature from your work area?
- How frequently do you utilize them?

- Does your office have highlights like great ventilation, air quality control, or agreeable temperature settings?
- How would they influence your work insight?

Well-Being and Performance:

- On a size of 1-5, how useful do you feel at work?
- Do you suppose this is connected with the greenness of your office?
- How frequently do you encounter pressure or weakness at work?
- Do you suppose the workplace climate assumes a part in this?
- How satisfied are you with your engagement and overall job satisfaction?
- Do you believe that green elements are a factor in this?
- How frequently do you take debilitated leave or feel unwell at work?
- How about the workplace climate be adding to this?

Extra Inquiries:

- Would you be willing to pay a slight premium to work in a greener office climate?
- What explicit green highlights do you suppose could be generally advantageous to add to your office?
- Do you have any ideas for working on the greenness of your on-going work area?

Frequent Asked Questions about the Green Buildings:

- [What is "green building"?](#)
- [What makes a building "green"?](#)
- [What are the benefits of green building?](#)
- [How is green building related to smart growth and sustainable development?](#)
- [How do buildings affect natural resources?](#)
- [How do buildings affect climate change?](#)
- [What is the history of green building in the U.S.?](#)
- [What building types can be green?](#)
- [Where can I see an example of a green building in my area?](#)
- [How can I incorporate green building concepts into my home?](#)
- [Is there federal or state legislation related to green buildings?](#)
- [What is Life-cycle Assessment?](#)
- [What are the economic benefits of green or sustainable building and development?](#)
- [Are green buildings more expensive to construct and operate?](#)
- [Where can I find sources of funding for my green building project?](#)
- [Can I get a tax break for building green?](#)
- [Where can I find more information about the components of green building, like energy efficiency or reduced waste?"](#)

- [What standards exist for green building?](#)
- [How are buildings certified as green in the U.S.?](#)

Table 2 Summary of studies investigating the perception and satisfaction of thermal comfort (TC) and IAQ in green buildings compared to non-green buildings, benchmark or to the scale midpoint

Study	Country or region	Buildings covered		Occupants surveyed		Outcome [†]		POE methods [‡]	Statistical metrics [§]	
		Green	Non-green	Green	Non-green	TC	IAQ		<i>p</i>	<i>d</i>
Brown et al. (2010)	Canada	1	1	104	145		A	I		
Thatcher and Milner (2016)	South Africa	3	2	211	69		A	I	•	•
Thatcher and Milner (2012)	South Africa	1	1	161	79		A	I	•	
Thomas (2010)	Australia	1	—	238	—		A	I, II	•	•
Tham et al. (2015)	Singapore	1	1	32	33	A	A	I, III	•	•
Liang et al. (2014)	Taiwan of China	3	2	134	99	A	A	I, III	•	
Sediso and Lee (2016)	R.O. Korea	2	2	222 [*]		A		I	•	
Pei et al. (2015)	Mainland of China	10	42	500	500	A		I, III	•	
Gou and Lau. (2013)	Mainland of China	1	—	182	—	A		I, III		
Gou et al. (2014)	Mainland of China	9	5	774	477	B		I	•	•
Ravindu et al. (2015)	Sri Lanka	1	1	70 [*]	—	B	B	I, III	•	
Paul and Taylor (2008)	Australia	1	2	40	53	B		I	•	
Collinge et al. (2014)	USA	1	—	48	—	B		I, II	•	
Altomonte and Schiavon (2013)	Global ^a	65	79	10,129	11,348	B	C	I	•	•
Menadue et al. (2014)	South Africa	4	4	600 [*]	—	C		I, III	•	•
Leaman and Bordass (2007)	UK ^b	177	—	—	—	C	C	I	•	•

Notes:

[†] Study outcome: A = higher satisfaction in green buildings, B = lower satisfaction, and C = no difference found.

[‡] POE methods covered: I = subjective assessment, II = energy performance, III = IEQ measurement.

[§] Whether studies use inferential statistics in determining outcomes: *p* indicates use of *p*-value for significance testing and *d* a generic measure of effect size, most commonly Cohen's *d*.

^{*} These studies do not explicitly provide per group sample sizes.

- Elnaklah, R. , Daniel Fosas, D. , Natarajan, S. 2020, by Indoor environment quality and work performance in “green” office buildings in the Middle East retrieved from <https://d-nb.info/1220279315/34>

**GREEN BUILDING QUESTIONNAIRE
(COMMERCIAL BUILDING and MULTI-FAMILY HOUSING)**

Applicant: _____
 Project Address: _____
 Multi-Family: _____ Sq. Ft. Area _____ Units
 Commercial: _____ Sq. Ft. Area _____ Units

Instructions for Use: The following questionnaire is a non-binding document used to both educate the applicant about Green Building measures (and how these can save money over time) and to inform the Borough's Department of Building, Housing and Codes Enforcement and the BLUER Committee about the Project's specific green initiatives. Applicants will find detailed information on each question by clicking on the highlighted link embedded within each question (or referencing associated footnote on the last page). Each applicant is asked to complete and sign the questionnaire to indicate they reviewed the questions and submit to the Borough's Department of Building, Housing and Code Enforcement with their Land Development Application for record. Additional information is available through www.westchester.org and www.westchester.com.

GENERAL			
☐ YES	☐ NO	☐ N/A	Is the Project pursuing LEED Certification ¹ from the US Green Building Council?
☐ YES	☐ NO	☐ N/A	Is the Project designed to achieve the ENERGY STAR ² ?
☐ YES	☐ NO	☐ N/A	Is the Applicant aware of Rebates ³ available through local utilities and tax incentives for Projects that incorporate energy efficient measures?

ENERGY EFFICIENCY			
☐ YES	☐ NO	☐ N/A	If the Project is a Renovation, does the scope include Heating, Ventilation and/or Air Conditioning Equipment efficiency upgrades ⁴ ?
☐ YES	☐ NO	☐ N/A	If the Project is a Renovation, does the scope include electrical and lighting equipment efficiency upgrades ⁵ ?
☐ YES	☐ NO	☐ N/A	Does the Project include Fundamental Commissioning ⁶ of the building energy systems?
☐ YES	☐ NO	☐ N/A	Is the project designed to meet minimum levels of energy efficiency ⁷ as Established by ASHRAE 90.1-2007?
☐ YES	☐ NO	☐ N/A	Does the Project utilize a whole building Energy Model ⁸ ? If yes, please submit copy for record with Building Permit Application.

☐ YES	☐ NO	☐ N/A	Does the Project utilize or make allowances for renewable energy technologies ⁹ ? If yes, what percentage of the total energy usage: _____
☐ YES	☐ NO	☐ N/A	Does the project utilize Energy Star rated appliances and equipment ¹⁰ ?
☐ YES	☐ NO	☐ N/A	Does the Project utilize high efficiency light fixtures and/or energy efficient lighting controls ¹¹ such as occupancy sensors as well as daylight sensors?
☐ YES	☐ NO	☐ N/A	Does the Project utilize individual electrical metering ¹² in multifamily units to reduce electricity consumption?

SITE DESIGN			
☐ YES	☐ NO	☐ N/A	Does the Project incorporate tree preservation or enhancement ¹³ in order to provide urban habitat for wildlife, provide cooling effect for pavement and rooftops, reduce stormwater runoff and provide for cleaner air?
☐ YES	☐ NO	☐ N/A	Are native plantings ¹⁴ with minimal water requirements incorporated into the non-stormwater related landscaping features?
☐ YES	☐ NO	☐ N/A	Are low impact design (LID) techniques ¹⁵ incorporated into the site design, (i.e. vegetated conveyance techniques, rain gardens, permeable pavements, vegetated ("green") roof, stormwater planters, or vegetated curb extensions, etc.) to provide for stormwater infiltration and evapo-transpiration?
☐ YES	☐ NO	☐ N/A	Does the Project utilize methods to minimize the heat island effect ¹⁶ generated from rooftops, parking areas, streets and driveways?
☐ YES	☐ NO	☐ N/A	Does the Project provide preferred parking for Low-Emitting/Fuel-Efficient Vehicles ¹⁷ and/or car pooling?
☐ YES	☐ NO	☐ N/A	Does the Project allow for reduced parking requirements, credit for shared parking or street parking, or under-structure parking ¹⁸ ?
☐ YES	☐ NO	☐ N/A	Does the Project provide smart transportation options ¹⁹ , including access to public transit, along with bicycle racks, signage and storage facilities?

MATERIAL RESOURCE			
☐ YES	☐ NO	☐ N/A	Does the Project provide easily-accessible dedicated area or areas for the <u>collection and storage of materials for recycling</u> ²⁶ for the entire building? Materials include: paper, corrugated cardboard, glass, plastics and metals.
☐ YES	☐ NO	☐ N/A	If trash is removed by a private hauler, does the building owner or tenant have a contract in place for <u>recycling collection</u> ²⁵ ?
☐ YES	☐ NO	☐ N/A	If the project includes a restaurant, does the building owner or tenant have a waste food collection program in place for <u>compost</u> ²⁶ ?
☐ YES	☐ NO	☐ N/A	Is there a requirement specifying a <u>diversion (from landfilling)</u> ²⁵ for Construction, Demolition or Renovation materials?
☐ YES	☐ NO	☐ N/A	Does the Project make allowances for green renovations or technologies that retain the historic character of <u>registered historic properties or resources</u> ²⁴ ?
☐ YES	☐ NO	☐ N/A	Does the Project promote the use of <u>environmentally responsible materials</u> ²⁵ ?

WATER EFFICIENCY			
☐ YES	☐ NO	☐ N/A	Is the use of <u>high efficiency</u> ²⁶ and innovative plumbing fixtures and fittings, such as WaterSense labeled, utilized to reduce water consumption?
☐ YES	☐ NO	☐ N/A	Does the Project utilize <u>individual metering</u> ²⁷ in multifamily units to reduce water consumption?
☐ YES	☐ NO	☐ N/A	Is the use of <u>rainwater harvesting systems</u> ²⁸ utilized for outdoor irrigation to reduce unnecessary use of potable water?
☐ YES	☐ NO	☐ N/A	In lieu of the above, is there a requirement for using <u>native plants</u> ²⁹ that will reduce the use of water for landscape maintenance?
☐ YES	☐ NO	☐ N/A	Are <u>innovative waste water technologies</u> ³⁰ utilized to reduce generation of waste water and potable water demand?

☐ YES	☐ NO	☐ N/A	If yes to the above, please explain:
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INDOOR AIR QUALITY			
☐ YES	☐ NO	☐ N/A	For multi-tenant residential buildings, does the project <u>prohibit smoking</u> ³¹ in common areas and design building envelope and systems to minimize ETS transfer among dwelling units?
☐ YES	☐ NO	☐ N/A	Does the Project make provisions for bettering the <u>indoor air quality</u> ³² (i.e., meeting the standards of ASHRAE 62.1-2007 (sections 4-7), among others)? This may also include separate ventilation for Janitor's Closets, copy rooms and maintenance shops, entry way systems or high efficiency air filters.
☐ YES	☐ NO	☐ N/A	Does the Project utilize <u>low-emitting materials (low or zero VOC)</u> ³³ ?
☐ YES	☐ NO	☐ N/A	Does the Project reduce the potential presence of <u>mold</u> ³⁴ through preventive design and construction measures AND training of maintenance personnel?

By signing below, you indicate that you have read and completed the above questionnaire.

(signature of applicant) (date)

(printed name of applicant) (date)

GREEN BUILDING QUESTIONNAIRE (COMMERCIAL BUILDING and MULTI-FAMILY HOUSING) retrieved from <https://west-chester.com/DocumentCenter/View/287/BLUER-questionnaire---November-17-2011-PDF>