

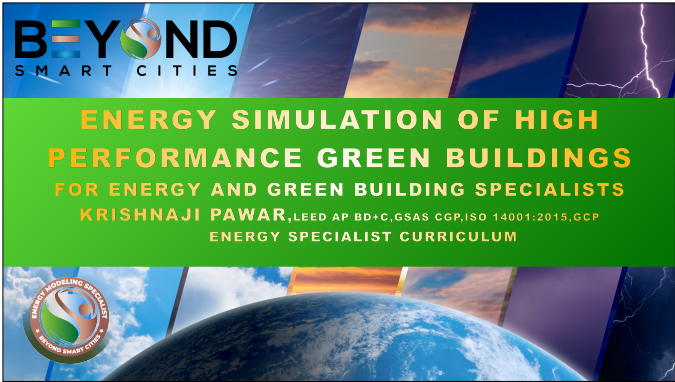
BEYOND

SMART CITIES

ENERGY SIMULATION OF HIGH
PERFORMANCE GREEN BUILDINGS
FOR ENERGY AND GREEN BUILDING SPECIALISTS
KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
ENERGY SPECIALIST CURRICULUM

ENERGY MODELING SPECIALIST

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GREEN BUILDING BASICS
FOR ENERGY AND GREEN BUILDING PROFESSIONALS
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LEARNING OBJECTIVES

ENERGY MODELING SPECIALIST

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Design Impact of Early Efforts
for Green building Design
Over View of Green Building
What is Sustainability ?
Environmental Impacts of
Building
Benefits of Green Design
Economic Benefits of
Sustainability



EARLY STAGE DESIGN DECISIONS

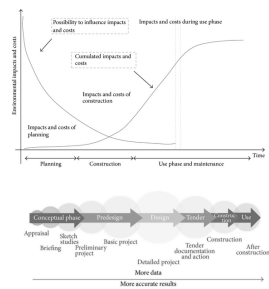
✓The construction industry attempts to produce buildings with as lower environmental impact as possible. However, construction activities still greatly affect environment; therefore, it is necessary to consider a sustainable project approach based on its performance

✓Sustainability is an important issue to consider in design, not only due to environmental concerns but also due to economic and social matters, promoting architectural quality and economic advantages.

✓The importance of considering sustainability in design stage meets the need for finding long-term solutions that warrant well-being and minimize the needs for natural resources as land use, biodiversity, water, air, and energy.

EARLY STAGE DESIGN DECISIONS:

THE WAY TO ACHIEVE SUSTAINABLE BUILDINGS AT LOWER COSTS



✓conceptual phase: it begins when the client meets the design team and the objectives of the project are defined. It represents a preliminary design phase of the building, in which the overall system configuration is defined and schematic drawings and layouts will provide an early project configuration, type of architecture, and formal and functional aspects. It lacks specific data;

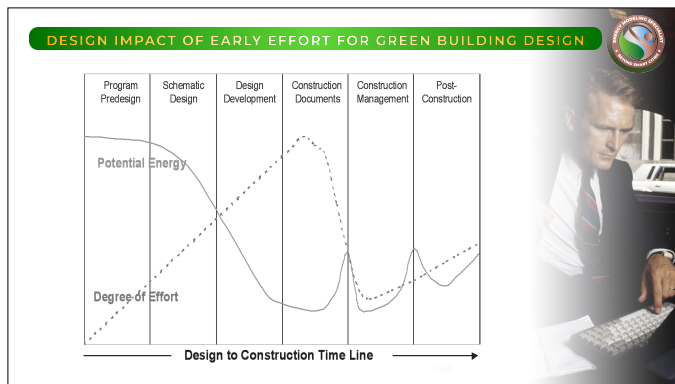
✓pre-design phase: it starts with the implementation of the working drawings; the general shape of the building is developed through plans, sections, and elevations; the provisional information addressed in the conceptual phase is confirmed or modified.

EARLY STAGE DESIGN DECISIONS

✓"Instead of trying to "force fit" sustainable principles into an existing and often unreceptive manufacturing system, it may be useful to approach the subject from the opposite direction, and consider how functional objects might be designed and manufactured to be compatible with principles of sustainable development"

✓A building's project obeys general criteria that allow its development on later stages; usually, main criteria respond to functional, economic, social, and time requirements. However, those are not enough to create a consistent base to achieve optimal results for the building.

✓New criteria and approach, that are usually not considered, can bring advantages to the project, favouring improvement of its performance and reducing its final cost. The sooner the project goals are defined and the new criteria are integrated, the more sustainable the building will be.



OVER VIEW OF GREEN BUILDING

A green building is one that achieves high performance, over the full lifecycle, in the following areas:

- ✓Minimal consumption—due to reduction of need and more efficient utilization—of nonrenewable natural resources, depletable energy resources, land, water, and other materials as well. (Corollary to this is maximization of the effective use of renewable resources to meet building needs.)
- ✓Minimal atmospheric emissions having negative environmental impacts, especially those related to greenhouse gases, global warming, particulates, or acid rain.
- ✓Minimal discharge of harmful liquid effluents and solid wastes, including those resulting from the ultimate demolition of the building itself at the end of its useful life.
- ✓Minimal negative impacts on site ecosystems.
- ✓Maximum quality of indoor environment, including air quality, thermal regime, illumination, acoustics/noise, and visual aspects.

WHAT IS SUSTAINABILITY

Sustainability is "providing for the needs of the present without detracting from the ability to fulfill the needs of the future."

SUSTAINABILITY DEFINITIONS

"Everyone talks about sustainability, but no one knows what it is." (Dr. Karl-Henrik Robert, founder of the organization, The Natural Step)

"Humanity must rediscover its ancient ability to recognize and live within the cycles of the natural world." (The Natural Step for Business)

Development is sustainable "if it meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland Commission of the United Nations)

To be sustainable, "a society needs to meet three conditions: its rates of use of renewable resources should not exceed their rates of regeneration; its rates of use of non-renewable resources should not exceed the rate at which sustainable renewable substitutes are developed; and its rates of pollution emissions should not exceed the assimilative capacity of the environment." (Herman Daly)

SUSTAINABILITY DEFINITIONS

"Sustainability is a state or process that can be maintained indefinitely. The principles of sustainability integrate three closely intertwined elements – the environment, the economy, and the social system – into a system that can be maintained in a healthy state indefinitely." (Design Ecology Project)

"In this disorganized, fast-paced world, we have reached a critical point. Now is the time to rethink the way we work, to balance our most important assets." (Paola Antonelli, Curator, Department of Architecture and Design, New York City Museum of Modern Art.)

Sustainability consists of fulfilling the needs of current generations without compromising the needs of future generations, while ensuring a balance between economic growth, environmental care and social well-being.

ACCEPTABLE GREEN DESIGN

The broad characteristics of good building design, encompassing both the engineering and non-engineering disciplines, outlined as follows:

- ✓Meets the purpose and needs of the building's owners/ managers and occupants
- ✓Meets the requirements of health, safety, and environmental impact as prescribed by codes and recommended by consensus standards
- ✓Achieves good indoor environmental quality (IEQ), which in turn encompasses high quality in the following dimensions: Thermal comfort, Indoor air quality (IAQ) ,Acoustical comfort and Visual comfort
- ✓Is compatible with and respectful of the characteristics, history, and culture of the immediate surroundings
- ✓Creates the intended emotional impact on the building's occupants and beholders

WHAT IS GREEN BUILDING

Design and Construction practices that significantly reduce or eliminate the negative impact that buildings have on:

- the environment and natural resources
- building occupants

BENEFITS OF GREEN DESIGN

ENVIRONMENTAL

- Reduce destruction of natural areas and habitats
- Preserve biodiversity
- Reduce air pollution, water pollution, and solid waste creation
- Reduce depletion of finite resources

ECONOMIC

- Reduce operating costs
- Enhance asset value
- Reduce or neutralize first costs
- Optimize life cycle performance
- Improve occupant productivity and health

HEALTH AND SAFETY

- Improved indoor air quality
- Improve acoustic environment
- Increase thermal comfort
- Decrease environmental contaminants and pollutants
- Personal control and flexibility