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BASICS OF BUILDING ENERGY MODELING - BEM

ONLINE PROFESSIONAL COURSES LED BY THE WORLD'S TOP SPECIALISTS

ONLINE TRAINING BY KRISHNAJI PAWAR

LEED AP(BD+C),GSAS CGP,GCP,ISO 14001

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MODULE 1

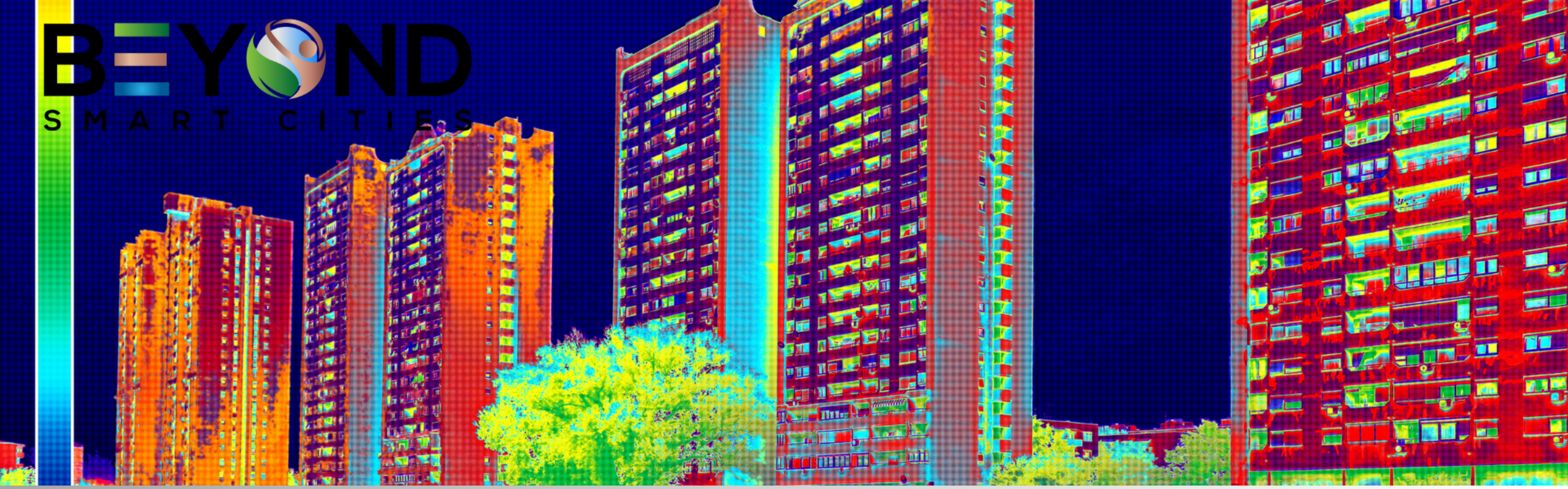
Introduction and Course Outline

KRISHNAJI PAWAR - CEO & FOUNDER

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BASICS OF BUILDING ENERGY MODELING - BEM

The Basics of Building Energy Modeling - BEM course introduces building energy modeling, a versatile tool used in new and retrofit building design, green certification, tax credit eligibility, and utility incentive programs.

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BRIEF ABOUT ME

Krishnaji PAWAR

CEO & FOUNDER



Krishnaji Pawar is founder and CEO of Beyond Smart Cities. Before being named CEO in January 2020, Krishnaji held leadership roles at Beyond Smart Cities in both Sustainability ,Energy & Environmental Consultancy.

Specialized in developing sustainable design strategies for Green Building Certification Systems (LEED, GSAS, etc.), Energy & Water Conservation, Commissioning, Environmental Impact Assessment & Environmental Management Systems.

Currently responsible for 3,787 million square feet Green Building /Energy modeling Consulting since January 2008 in UAE, India and Qatar.

Learning Objectives

- Introduction
- What is Building Energy Modeling (BEM)?
- Building Energy Codes and Standards
- Building Energy Modeling Tools
- LEED and Building Energy Modeling
- Building Energy Modeling and Commissioning
- Benefits of Building Energy Modeling
- Professional energy modeling specialist certification
- Summary and Resources
- Basics of BEM Quiz_Test Your Knowledge!

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INTRODUCTION

- The Intergovernmental Panel on Climate Change (IPCC) says buildings are the cheapest way to reduce carbon emissions.
- This category has twice the cost capacity of industry.
- It helps to know that early building design decisions reduce energy consumption and climate emissions.
- The IPCC estimates that recent advances in building technologies, know-how, and policies can stabilize or reduce global energy use to current levels by mid-century.Architecture uses BEM tools to harmonize them.
- Early and frequent use of these tools allows teams to track and benchmark project design goals.

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INTRODUCTION

- The Basics of Building Energy Modeling (BEM) course is ideal for those who want to learn modeling concepts and demonstrate ECBC and ASHRAE compliance.
- Modern, sustainable building design requires energy modeling.
- The process involves creating digital models that accurately simulate a structure's energy use, thermal efficiency, and environmental impact over its lifetime.
- This process optimises building design, systems, and operations for energy efficiency and environmental impact using advanced software and data analysis.



BUILDING ENERGY MODELING



Energy modeling is basically a process used to estimate the possible energy expenditure of a building by factoring in its mechanical systems, construction materials, specific site characteristics, average local climate conditions, and expected occupant requirements. It's used to evaluate how various systems within a building interact.

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WHY DOES ENERGY MODELING MATTER?

- Engineers and architects alike can set specific energy-efficiency goals for their clients.
- It can be used to help projects obtain LEED certification
- It’s possible to measure specific HVAC and lighting usage which, in turn, can satisfy LEED requirements in those fields
- Design professionals will be able to estimate a building’s future energy usage and cost
- There is a business case for the use of BEM in architectural design.
- There are three different financial areas where savings can occur for existing building owners and operators, making buildings more resilient in terms of fuel source availability, and making affordable housing more affordable.



THE ECONOMIC ADVANTAGES OF BUILDING ENERGY MODELING(BEM)





- Using BEM helps identify energy conservation measures (ECMs), along with proper HVAC system sizing for a given project.
- Energy efficiency can create a building that has the potential to be resilient to future economic shifts, in addition to fuel source uncertainty.
- A building that is more energy efficient will rely less on grid-tied energy, and adding renewable energy will further improve a building's resilience.

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WELCOME TO BEYOND SMART CITIES

Beyond Smart Cities is the world's 1st Green Technology Marketplace, connecting millions of Sustainability Specialists, Green Building Specialists, Energy Specialists, Commissioning Specialists, Environment Specialists, Health & Safety Specialists, Fire Safety Specialists, Climate Change Specialists & Green Products/Technology Manufacturers with independent talent around the globe.

Our mission is to build and support a global community of experts with the highest professional standards in sustainability, green building, energy, commissioning, environment, health & safety, fire safety, climate change, GHG accounting, carbon auditing, and GHG emissions management.



DEFINITION AND PURPOSES OF BEM



- Today, using BEM in building design is crucial to a successful architectural / Engineering practice.
- BEM professionals certified by a consortium of professional organizations are increasing in energy modeling.
- This basic course is for architects / engineers who want to implement the most energy-efficient methods in building design without becoming BEM experts.

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Baseline model : the set of arithmetic factors, equations, or data used to describe the relationship between energy use or demand and other baseline data. A model may also be a simulation process involving a specified simulation engine and set of input data

Boundary conditions :physical conditions (values of physical quantities, conditions of energy interchange, etc.) imposed upon a system at the start or end of a process (temporal boundary conditions) and/or at the boundaries separating the system from its surroundings (local boundary conditions)

Building envelope : (1) outer elements of a building, including walls, windows, doors, roofs, and floors, including those in contact with earth. (2) the exterior plus the semi-exterior portions of a building. For the purposes of determining building envelope requirements, the classifications are defined as follows. Building envelope, exterior: the elements of a building that separate conditioned spaces from the exterior. Building envelope, semi-exterior: the elements of a building that separate conditioned space from unconditioned space or that enclose semiheated spaces through which thermal energy may be transferred to or from the exterior, to or from unconditioned spaces, or to or from conditioned spaces



Urban energy system : a formal system that rep- resents the combined processes of acquiring and using energy to satisfy the energy service demands of a given urban area.

“composition of all components related to the use and provision of energy services associated with a functional urban system, irrespective where the associated energy use and conversion are located in space “

Urban building energy modeling : UBEM involves developing energy models of buildings using their geometric and non-geometric features and simulating them in a simulation engine, just like BEM.

The modeling process is more complicated and fraught with uncertainty.

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