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BUILDING ENERGY SIMULATION ANALYST - BESA OVERVIEW

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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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.





MODULE

1

Introduction and Course Outline

KRISHNAJI PAWAR - CEO & FOUNDER

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BUILDING ENERGY SIMULATION ANALYST - BESA OVERVIEW

The BESA Overview training program equips individuals with essential skills, knowledge, tools, credentials, and practice exam questions for energy modelling (BESA Knowledge domain).

Learning Objectives

- **Introduction**
- Getting Started with BEM
- Establishing the Model Scope
- Building Energy Modeling Tools
- LEED, Commissioning, & Energy Conservation
- Benefits of Building Energy Modeling
- Certification for energy modeling specialists
- Summary and Resources
- Building Energy Simulation Analyst - BESA Practice Test V.4.1



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.

BUILDING ENERGY SIMULATION ANALYST - BESA OVERVIEW



- Training program teaches fundamental skills, information, and tools for energy modeling.
- Provides credentials in energy modeling field and 10+ practice exam questions.
- Energy models assess the interplay of various components to achieve project team's energy objectives and ensure comfort.
- Architects/Energy Engineers must understand energy modelling fundamentals to lead the design process.
- Utilizes advanced software tools and data analysis methodologies to optimize building design, systems, and operations.
- Energy models predict building performance and are crucial for assessing key design decisions in advance.

BUILDING ENERGY SIMULATION ANALYST - BESA OVERVIEW

- Utilizes computer simulations to realistically depict building designs and perform physics-based calculations.
- Simulations can cover a single building component or a cluster of structures.
- Requires building model, usage pattern, and location weather to determine outputs like peak loads, system sizing, and energy consumption.
- Useful for early design decisions, component or material selection, and retrofitting decisions.
- Can be used to estimate utility bills and compare cost-benefit of design options.



BUILDING ENERGY SIMULATION ANALYST OVERVIEW +

- Beyond Smart Cities specializes in energy modelling for various building types and climate zones.
- Energy modelling has been used to size cooling and heating equipment in buildings.
- Energy models have been created to improve building performance throughout all design stages.



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.



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.





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 represents 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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CONTACT US



+91 6363032722



info@beyondsmartcities.in



learn.beyondsmartcities.in



#55,HMR Layout ,Bengaluru ,India



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