
BEYOND
welcome to
BEYOND SMART CITIES


BEYOND
SMART CITIES
ENERGY MODELING SPECIALIST
BEYOND SMART CITIES
INTERPRETATIONS OF ENERGY MODEL RESULTS
ONLINE PROFESSIONAL COURSES LED BY THE WORLD'S TOP SPECIALISTS
ONLINE TRAINING BY KRISHNAJI PAWAR
LEED AP(BD+C),GSAS CGP,GCP,ISO 14001
LEARN.BEYONDSMARTCITIES.IN

BEYOND SMART CITIES

MODULE L1

Introduction and Course Outline

KRISHNAJI PAWAR - CEO & FOUNDER

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

WWW.BEYONDSMARTCITIES.IN

BEYOND SMART CITIES

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.

BEYOND SMART CITIES

INTERPRETATIONS OF ENERGY MODEL RESULTS

The training program "Interpretations of Energy Model Results" goes over many different areas of energy modeling, such as interpretation, verification, troubleshooting, analysis, economic analysis, sensitivity analysis, special calculation methods, project deliverables, and LEED interpretations. It covers various aspects, such as reality checks, software checks, parametric bracketing, load resolution, and hours outside the control range.

Learning Objectives

- Introduction and Course Outline
- Verification and Fixing of Simulation Results
- Analyzing and Comparing Modeling Results
- Economic Analysis
- Sensitivity Analysis
- Exceptional calculation methods
- Building Energy Modeling Project Deliverables
- Interpreting Model Results
- Sample Energy Modeling Report
- Summary and Resources
- BEMP Practice Test V.5.1

BEYOND SMART CITIES

INTRODUCTION

- Focuses on interpreting energy model results for architects, engineers, and building performance analysts.
- Covers key components like interpretation of results, reality checks, parametric bracketing, anomalies review, load resolution, economic analysis, exceptional calculation methods, communication of results, LEED interpretations, and practice exam questions.
- Emphasizes accuracy in interpreting results for improved energy efficiency.
- Includes reality checks, parametric bracketing, anomalies review, load resolution, and economic analysis.
- Emphasizes clear documentation and visualizations for stakeholders.
- Essential for LEED Interpretations for projects seeking LEED certification.

ENERGY MODELS FOR BUILDINGS: APPLICATIONS AND EVOLUTION

- Energy modeling is a crucial tool for understanding and optimizing building energy performance.
- It provides architects, engineers, and policymakers with the methodology to design energy-efficient structures and evaluate existing buildings' performance.

Evolution of Energy Modeling

- Energy modeling in architecture and engineering has undergone significant transformations.
- In the mid-20th century, architects began to rely more on engineers for decisions about building comfort and lighting.
- As environmental impact awareness grew, the industry recognized the importance of energy modeling.

BEYOND SMART CITIES

CORE APPLICATIONS OF BUILDING ENERGY MODELING

BEYOND SMART CITIES

- Architectural Design: Energy modeling helps architects evaluate design alternatives and their potential impact on energy consumption.
- HVAC Design and Operation: Energy modeling helps engineers design and optimize HVAC systems.
- Building Performance Rating: Energy models assess a building's inherent performance, influencing regulatory and financial processes.
- Building Stock Analysis: Energy modeling aids in the development of energy codes and standards.
- Whole-Building Energy Modeling (BEM): BEM offers a holistic approach to evaluating both new and existing structures.

"INTERPRETATIONS OF ENERGY MODEL RESULTS" TRAINING PROGRAM OVERVIEW

BEYOND SMART CITIES

- Focuses on interpreting energy model results for architects, engineers, and building performance analysts.
- Includes reality checks, parametric bracketting, anomalies review, load resolution, economic analysis, exceptional calculation methods, communication of results, LEED interpretations, and practice exam questions.
- Reality checks compare model outputs with real-world data and verify software functionality.
- Parametric bracketting helps understand model outputs' sensitivity to inputs.

"INTERPRETATIONS OF ENERGY MODEL RESULTS" TRAINING PROGRAM OVERVIEW +

BEYOND SMART CITIES

- Load resolution breaks energy loads into specific categories for targeted energy efficiency strategies.
- Hours outside control range reveals HVAC system performance or building envelope inefficiencies.
- Economic analysis evaluates cost implications of energy model outputs.
- Communication of results is vital for stakeholders unfamiliar with modeling complexities.
- LEED interpretations are essential for projects seeking LEED certification.
- The program equips participants with skills to analyze, interpret, and communicate energy modeling results effectively.

HOW SIMULATION OR BEM SOFTWARE WORKS

BEYOND SMART CITIES

- Simulated interaction of geometric model with outdoor conditions, occupancy, and building system usage.
- Predicts various loads arising in the building on an hourly basis.
- Uses basic physics laws and energy balance equations for calculations.
- Calculates energy consumption for systems corresponding to heat and other loads.
- Results are passed to calculations of the next slice and supplied to the output file.
- Process continues for the entire simulation duration, with final output seen as aggregated or on the same time slice.
- Considers various effects of thermophysical properties of materials and performance of systems under varying environmental conditions.
- Requires no special computing power, can be run on commercially available desktop computers or laptops.

BIM TOOLS AND USERS

BEM tools include:

- EnergyPlus: A comprehensive simulation program that models energy consumption, water usage, and HVAC performance.
- eQUEST: A user-friendly software based on the DOE-2 engine.
- TRACE 700: Developed by Trane, specifically designed for HVAC system design and energy analysis.
- OpenStudio: An open-source software platform that facilitates the creation and simulation of building energy models.
- DesignBuilder: Offers a range of modeling capabilities, including energy performance simulation, daylighting analysis, and airflow modeling.

USERS OF BEM TOOLS

- **Architects:** Utilize BEM to inform design decisions that enhance energy efficiency and occupant comfort.
- **Mechanical Engineers:** Use BEM to size and select HVAC systems based on the energy demands of the building.
- **Energy Consultants:** Analyze energy models to provide recommendations for energy conservation measures and compliance with energy codes.
- **Facility Managers:** Employ BEM to monitor energy performance and identify opportunities for operational improvements in existing buildings.

WHY DOES ENERGY MODELING MATTER?

BEYOND SMART CITIES

- 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.

BUILDING ENERGY MODELING PROFESSIONAL CERTIFICATION

BEYOND SMART CITIES

- Building Energy Modeling (BEM) is an analytical process using computer simulation tools to predict energy consumption.
- BEM is crucial for architects, engineers, and energy consultants to optimize energy efficiency, reduce costs, and minimize environmental impact.
- ASHRAE, founded in 1894, promotes sustainable building design, energy efficiency, and standards development.
- BEMP Certification assesses an individual's ability to apply energy modeling software and interpret results for informed building design and operation decisions.
- Eligibility criteria include a bachelor's degree in engineering, relevant work experience, and understanding of building systems, energy performance metrics, and energy modeling tools.
- BEMP certification establishes professional credibility in BEM, promotes standardization, and enhances energy efficiency.
- The BEMP certification evaluates candidates on Modeling Fundamentals, Software Applications, Data Analysis and Interpretation, and Building Systems Knowledge.

THE ECONOMIC ADVANTAGES OF BEM

- Reduction in Construction Costs: BEM can reduce construction costs through informed design decisions. It can evaluate the upfront costs and operating efficiencies of each system under various conditions.
- Enhanced Operational Efficiency: BEM provides a detailed analysis of how different systems and design features affect energy consumption throughout a building's lifecycle. This predictive capability allows for the optimization of energy use, increasing operational efficiency.
- Decreased Energy Costs: BEM can significantly lower energy costs by accurately modeling energy consumption patterns. It can lead to substantial cost savings on energy bills.
- Compliance with Regulations and Incentives: BEM assists in ensuring compliance with energy codes and regulations, leading to financial incentives such as tax credits, rebates, and grants.
- Lifecycle Cost Analysis: BEM facilitates comprehensive lifecycle cost analysis (LCCA), which assesses the total cost of ownership over a building's life span.

BEYOND
SMART CITIES

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.

KEY TERMINOLOGIES

Energy Modeling: A method used to simulate a building's energy performance under different conditions to assess its energy consumption and efficiency.

Interpretation: The process of explaining or making sense of the results obtained from energy models to ensure they are accurate and meaningful.

Verification: The act of checking that the energy model is functioning correctly and that its outputs are reliable.

Sensitivity Analysis: A technique used to determine how different values of an input can impact the output of a model, helping to understand the model's robustness.

Economic Analysis: The evaluation of the cost implications of energy model outputs, including potential savings and expenses.

LEED: Leadership in Energy and Environmental Design, a certification program for green buildings that promotes sustainable practices.

Energy Charrette: A collaborative workshop where stakeholders discuss and design strategies for energy efficiency in buildings.

ASHRAE: The American Society of Heating, Refrigerating, and Air-Conditioning Engineers, which sets standards for building energy efficiency.

Energy Use Intensity (EUI): A metric that measures a building's energy consumption relative to its size, useful for comparisons.

Peak Load Analysis: An assessment of the maximum energy demand for heating and cooling in a building.

BEYOND SMART CITIES

CONTACT US

+91 6363032722

info@beyondsmartcities.in

learn.beyondsmartcities.in

#55,HMR Layout ,Bengaluru ,India

BEYOND SMART CITIES

ENERGY MODELING SPECIALIST
BEYOND SMART CITIES

THANK YOU