BEYOND
SMART CITIES



welcome to

BEYOND SMART CITIES



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

LEARN.BEYONDSMARTCITIES.IN

BEYOND SMART CITIES

MODULE 6

Building Energy Modeling and Commissioning

KRISHNAJI PAWAR - CEO & FOUNDER

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

WWW.BEYONDSMARTCITIES.IN





BASICS OF BUILDING ENERGY MODELING - BEM

Commissioning and energy modeling work together to conserve energy and improve building performance. Energy models can discover energy savings potential, assess building system performance, and evaluate building performance after commissioning to help building owners save more energy and maximize efficiency.

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!

BEYOND SMART CITIES

INTRODUCTION

- Building commissioning and energy modeling complement each other to optimize building performance and save energy.
- Energy models can identify energy savings opportunities, validate building system performance, and evaluate building performance after commissioning to help building owners save even more energy and ensure peak performance.
- Energy models help building commissioning optimize HVAC systems, install energy-efficient lighting, and evaluate solar panel performance.
- Thus, building owners should include building commissioning and energy modeling in any construction or renovation project.
- Combining these two processes allows building owners to reduce energy consumption and optimize performance.
- This class will examine the best energy models for building commissioning, with many examples.

COMMISSIONING THE BUILDING ENERGY MODEL

- Commissioning is a process - a systematic process of ensuring that a building performs in accordance with the design intent, contract documents, and the owner's operational needs.
- Energy models help building commissioning identify energy savings opportunities.
- Commissioning agents can use energy models to verify building system performance and energy savings.
- An energy model may estimate a 20% energy savings from a new lighting system.
- Energy modeling and building commissioning work together to improve building performance and save energy.

BEYOND SMART CITIES



BEYOND SMART CITIES



WHY DO WE DO AN ENERGY MODEL?

- Building owners can maximize energy savings and building performance by using energy models to identify energy savings opportunities, validate building system performance, and evaluate building performance after commissioning.
- Energy models help building commissioning optimize HVAC systems, install energy-efficient lighting, and evaluate solar panel performance.
- Building commissioning and energy modeling should be part of any construction or renovation project.



The "Commissioning of Buildings and HVAC Systems for Improved Energy Performance" task investigating the use of Whole Building Simulation in Commissioning has identified the following applications of whole building simulation in the commissioning process:

1) during the design process;
2) in the post-construction commissioning of new buildings;
3) design simulation for on-going commissioning;
4) calibrated simulation for retro-commissioning;
5) calibrated simulation for on-going commissioning; and
6) Simulation to evaluate the new control code

KEY FACTORS IN WHOLE-BUILDING SIMULATION FOR COMMISSIONING

- The use of whole-building simulation in commissioning is likely to be most practical in situations in which a simulation has already been performed as part of the design process or as part of an evaluation of a retrofit.
- After that, the simulation can be used to make predictions about the performance of the building, and any deviations from those predictions would indicate the need for commissioning measures to bring the building closer to the design intent.



KEY FACTORS IN WHOLE-BUILDING SIMULATION FOR COMMISSIONING+

- However, the specific comparisons that can be carried out will be dictated, at least in part, by the capabilities of the simulation model, as well as, at least in part, by the performance data that is available for comparison with the simulation.
- The majority of the time, the data from the EMCS will be used for comparison with the simulation.
- In general, we will use the simulation to evaluate either "passive testing" or "active testing," both of which we will refer to as "testing."



INTEGRATING ENERGY MODELING & BUILDING COMMISSIONING WITH EMIS TO OPTIMIZE BUILDING SYSTEM OPERATION

BEYOND SMART CITIES



Integration of BEM, EMIS, and Cx provides increased accuracy of pre-handoff Cx services and more comprehensive Cx services that extend through initial post-occupancy evaluation (warranty phase) and into ongoing retro-commissioning (RCx).

- Cx and BEM-based design services can now be used to address the design performance intent.
- Integration of BEM, EMIS, and Cx provides increased accuracy of pre-handoff Cx services. Integration of BEM, EMIS, and Cx facilitates more comprehensive Cx services that extend through initial post-occupancy evaluation.

Design-Build Retrofitting

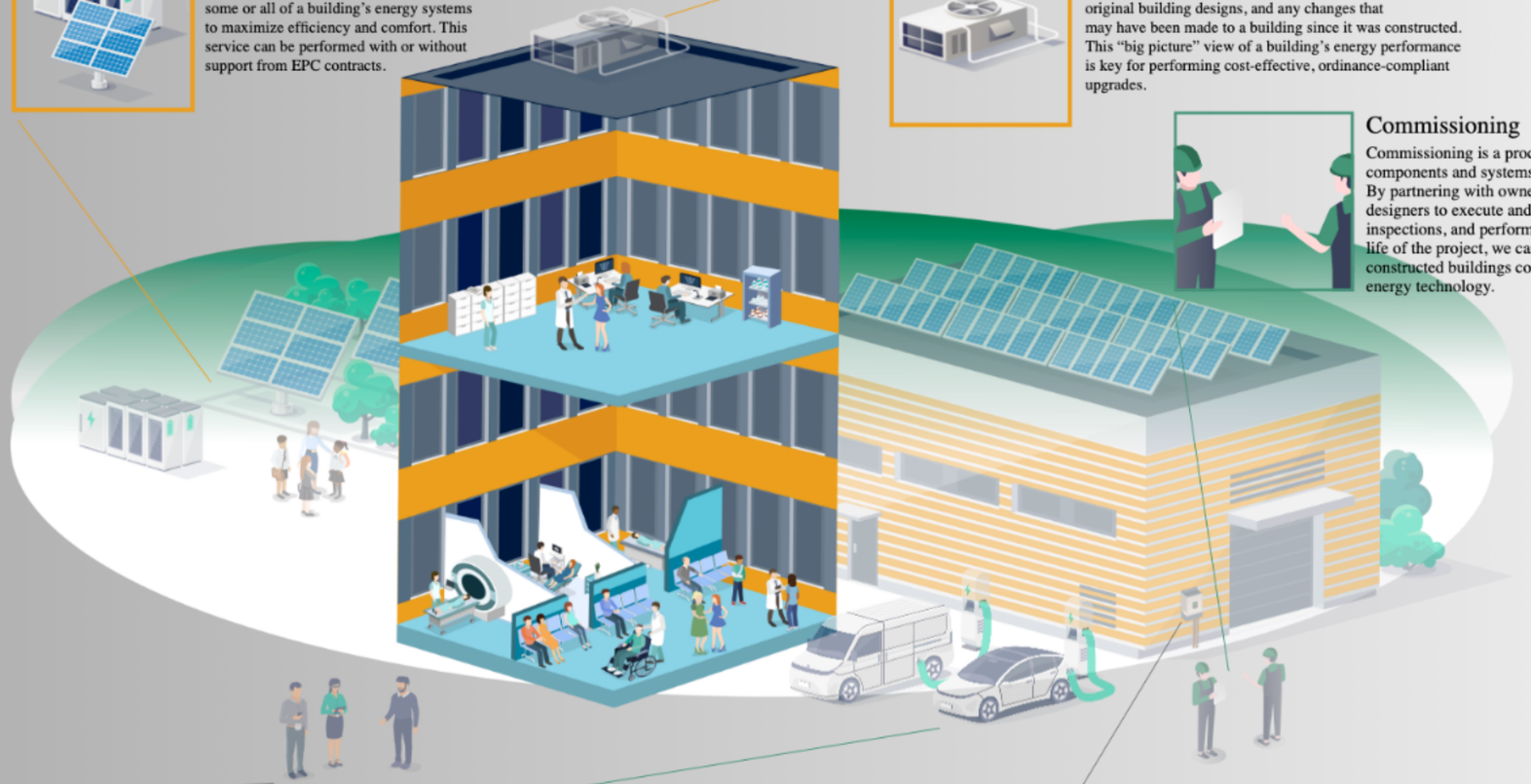
Design-build retrofitting (EPC and non/EPC) involves redesigning and replacing some or all of a building's energy systems to maximize efficiency and comfort. This service can be performed with or without support from EPC contracts.

Retro-Commissioning (RCx)

RCx involves monitoring current energy performance, original building designs, and any changes that may have been made to a building since it was constructed. This "big picture" view of a building's energy performance is key for performing cost-effective, ordinance-compliant upgrades.

Commissioning

Commissioning is a process to ensure building components and systems meet the owner's intent. By partnering with owners, contractors, and designers to execute and document reviews, inspections, and performance tests throughout the life of the project, we can ensure your newly-constructed buildings contain the latest, greatest energy technology.



Energy Consulting

Virtually all of our projects start with energy consulting. We'll perform an in-depth assessment of your facilities, determine what infrastructure canbe upgraded or replaced to improve efficiency, and set a timeline for your project. This process ensures we're checking all our boxes and laying out a concise framework for work to proceed.

Monitoring-Based Commissioning (MBCx)

Energy systems need regular maintenance to perform properly. MBCx allows us to monitor energy systems over time, find inefficiencies in system operations and maintain them to ensure long-lasting, cost-saving performance.

Energy Audits & Modeling

Making sense of your facility's energy use is vital for improving energy efficiency. Audits help us pinpoint wasteful energy systems, while modeling offers a look at how energy is used before, during, and after any changes to physical infrastructure.

INTEGRATING ENERGY MODELING & BUILDING COMMISSIONING WITH EMIS TO OPTIMIZE BUILDING SYSTEM OPERATION +

Improved access to BAS

- Reduced dependency on Controls Sub for BAS access
- No misrepresentation of construction status or operation

Early feedback on system operation

- Trending and fault detection begin immediately.

Holding the project team accountable for design, construction,warranty, and on-going operation

- Track corrective actions
- Verify that faults have been corrected.
- Validating building performance andOperation prior to turnover to facilities



INTEGRATING BEM AND EMIS WITH BUILDING SYSTEMS COMMISSIONING CAN PROVIDE AMORE THOROUGH ASSESSMENT OF POST-OCCUPANCY ENERGY CONSUMPTION BY ACCOMPLISHING THE FOLLOWING:

- Reduce and quantify the uncertainties implicit in any pre-occupancy EUI.model
- AccountAbilitI
- Audit or validate the drift from Design EUl into an item-by-item RCx action list.
- Assign project team accountability for addressing EU performance drift.
- Create a feedback loop to train, inform, guide, and incentivize building facilities.staff to help maintain continuous El performance tuning via continuous RCx
- Project the future impact of selected corrective actions by the CX team.owners, facility personnel, subcontractors, and manufacturers on the wholebuilding EUl



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

