
ENERGY MODELING SPECIALIST
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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 4

Building Energy Modeling Tools

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BASICS OF BUILDING ENERGY MODELING - BEM

BEM is a versatile tool utilized in new construction and retrofit design, code compliance, green certification, tax credit and utility incentive qualifying, and real-time building control. BEM informs policy and building energy-efficiency code development in large-scale evaluations.

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

- Why do we need energy modeling software?
- Building Energy Modeling Tools
- Common Energy and Renewable Energy Tools
- Summery of Available Analysis & Modeling Tools

WHY DO WE NEED ENERGY MODELING SOFTWARE?

- Residential and commercial sectors consumed 40% (40 quadrillion British thermal units) of U.S. energy in 2018 [EIA, May 2019].
- Energy modeling software can help project teams examine design options for life-cycle cost impacts to enhance building performance.
- Material choices, mechanical and electrical systems, sun orientation, temperature, and human usage all affect building energy performance.
- Complex interactions might result from design component modifications, making them hard to analyse.
- Building energy modeling software evaluates energy consequences across dynamic linked systems.



BUILDING ENERGY MODELING TOOLS

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- The choice of which BEM tool to use will also influence the amount of data required and the level of detail needed.
- Choosing the right BEM for what you want is important, and two key factors to consider are at which point in the design process and for what purpose the BEM tool is used.
- Each BEM tool's features are its distinctive attributes, and they include different analysis processes or default templates—essentially, specific elements that aid in our input and output from the software.



BUILDING ENERGY MODELING TOOLS +

- How they operate with other software and their interoperability with your BIM or CAD program is a pathway to understanding BEM's applicability and ease of adoption into your work.
- What we can conclude from this is that there is no one-size-fits-all program for BEM.



AVAILABLE ANALYSIS & MODELING TOOLS



SUMMERY OF AVAILABLE ANALYSIS & MODELING TOOLS

Stage	Requirements	Tools	Reality Checks
Scoping	- Quick analysis - Comparative results - Reduce alternatives to consider - Control strategy modeling	- System Analyzer™ - Modified bin analysis (where load is not entirely dependent on ambient conditions)	- Operation cost per ft^2 - Payback or other financial measure
System Design	- Accurate output - Industry-accepted methods	- HAP - TRACE 700 - Elite Design	- cfm/ft^2 - cfm/ton
Energy/Cost Analysis	- Accurate - Industry-accepted methods - Flexible - Allows modeling of complex control strategies - Complies with ECB method requirements of ASHRAE 90.1-2001 - Works for existing building and systems	- EnergyPlus - DOE - HAP - TRACE 700 - SUNREL	- Btu/h-ft^2 per year - Operation cost per ft^2 - Payback or other financial measure
Monitoring	- Simplicity - Intuitive interface - Systemwide - Interoperable	- BacNET—compatible auto-mation systems	- Trended operating character-istics - Benchmark comparisons (such as system kW/ton)

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