



COMMISSIONING THE BUILDING ENERGY MODEL

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



MODULE

01

Introduction and Course Outline

KRISHNAJI PAWAR - CEO & founder
LEED AP(BD+C), GSAS CGP, GCP, ISO 14001

WWW.BEYONDSMARTCITIES.IN





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.

Beyond

SMART CITIES

BRIEF ABOUT ME

Krishnaji PAWAR

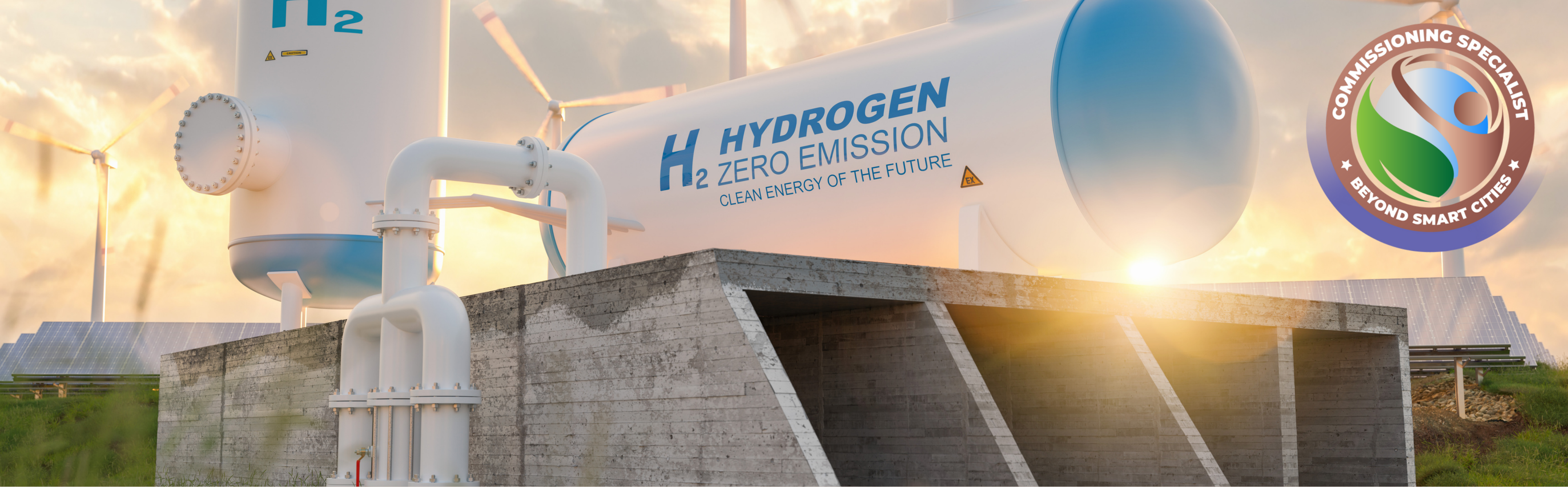
CEO & FOUNDER

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.





COMMISSIONING THE BUILDING ENERGY MODEL

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 modeling has three steps.

Learning Objectives

- **Introduction and Course Description**
- **Commissioning the Building Energy Model**
- **Building Energy Model: Theoretical or Predicting the Actual?**
- **Why do we have a Building Energy Model?**
- **Why Commission the Energy Model?**
- **Using Energy Models for Building Commissioning**
- **Different building-level commissioning models**
- **Simulation model examples at the building level**



LEARNING OBJECTIVES

- 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 modeling has three steps.
- 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

- Whole-building models are used for HVAC system design but not commissioning. Pre-design models and simulations are used.
- These models have many default inputs to speed their use and provide early feedback on major envelope or system configuration options. Detailed models are used to size heating and cooling equipment during design, and a simulation model like DOE-2, TRNSYS, EnergyPlus, etc. can be used to explore the effects of a few design options on annual energy use.
- The continuous use of simulation throughout a building's life cycle has been considered for two decades (middle east Project), but it has never been implemented.



DEFINITION AND PURPOSES OF COMMISSIONING

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.

Define key terms: Commissioning , ASHRAE, Basis of Design (BOD), Enhanced Commissioning, Measurement & Verification (M&V) and Building Energy Modelling



Beyond

SMART CITIES



ASHRAE: American Society of Heating Refrigerating and Air-Conditioning Engineers is an international organization with a mission of advancing heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education.

Basis of Design (BOD):The documentation by the design team of the primary thought processes and assumptions behind design decisions that are made to meet the Owner's Project Requirements. The BOD describes the assumptions used for sizing and selection of systems (i.e. codes, standards, operating conditions, design conditions, weather data, interior environmental criteria, other pertinent design assumptions, etc.).

Building Performance Monitoring & Metric:Using tools that compile building data into a few useful metrics to help operators understand whether their building technology is working as intended.

B E Y O N D

S M A R T C I T I E S



Enhanced Commissioning: The United States Green Building Council's Leadership in Energy and Environmental Design (LEED) program also distinguishes between "fundamental" commissioning and "enhanced" commissioning. Enhanced commissioning includes the additional tasks of: conducting design review prior to the end of design development; reviewing contractor submittals for energy-related systems; developing recommissioning manual; and inspecting operation of energy-related systems within 10 months of final acceptance and develop plan to resolve outstanding issues. The additional work associated with enhanced commissioning tends to result in a 15 percent first-cost premium compared with fundamental commissioning.

Building Energy Model (BEM): BEM is physics-based software simulation of building energy use. A BEM program takes as input a description of a building including geometry, construction materials, and lighting, HVAC, refrigeration, water heating, and renewable generation system configurations, component efficiencies, and control strategies.



BEYOND SMART CITIES

M&V: measurement and verification A process that includes a wide range of measurement, verification, and analysis techniques for quantifying the results of resource efficiency and resource management activities

Statistical models are probability models, and **physical models** are causal, deterministic, or mixed causal-deterministic-probability models applied to observable propositions. It is observations that turn probability into statistics. Statistical and physical models are thus verifiable, and all use statistics in their verification. All models should be verified, but most aren't.

ECM:Energy Conservation Measure

Baseline: A characterization of the energy use and operating conditions during a specified period of time prior to implementation

Adjusted baseline model: A model developed using data from the baseline period and incorporating routine and non-routine adjustments against which an energy conservation measure's actual performance is compared.



Avoided energy use: Avoided energy use means the reduction in electricity use that occurred in the performance period, relative to what would have occurred if the facility had been equipped and operated as it was in the baseline period but under performance period conditions.

A statistical model is a model that attempts to identify correlations and other patterns in actual measured data.

Physical model: Energy systems models are the mathematical models that are developed in order to represent as reliably as possible various energy-related problems. Lately, these models have become a common means to identify and solve such problems.

ESCO: Energy savings performance contracting



CONTACT US



+91 6363032722



info@beyondsmartcities.in



learn.beyondsmartcities.in



#55,HMR Layout ,Bengaluru ,India



THANK YOU

