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# BUILDING ENERGY MODELING STEP-BY-STEP PROCEDURES FOR LEED CERTIFICATION

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**ONLINE TRAINING BY KRISHNAJI PAWAR**

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

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# ASHRAE Standard 189.1-2020

KRISHNAJI PAWAR - CEO & FOUNDER

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

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# **BUILDING ENERGY MODELING : STEP-BY-STEP PROCEDURES FOR LEED CERTIFICATION**

ASHRAE Standard 189.1-2020 is a framework developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) to enhance the sustainability and performance of high-performance green buildings. The standard outlines minimum requirements for sustainable design, construction, and operation, focusing on minimizing environmental impacts while optimizing energy efficiency and occupant comfort.

# Learning Objectives

- Introduction and Course Outline
- Building Energy Modeling Checklists
- Scaling an imported drawing from AutoCAD
- **ASHRAE Standard 189.1-2020**
- BEM software inputs for the project section, facade, systems, and zones
- Setup and Running the Building Energy Modeling Simulation
- Review BEM Software Output Reports.
- Sample Energy Modeling Report
- Summary and Resources
- BEMP Practice Test V.4.1



## INTRODUCTION

- Developed by ASHRAE to enhance sustainability and performance of green buildings.
- Outlines minimum requirements for sustainable design, construction, and operation.
- Focuses on minimizing environmental impacts, optimizing energy efficiency, and occupant comfort.
- Emphasizes resource efficiency, indoor environmental quality, and sustainable sites.
- Emphasizes lifecycle assessments (LCAs) in selecting materials.
- Commissioning ensures building systems perform interactively according to design intent and owner's operational needs.
- Adherence to the standards contributes to a more sustainable built environment.

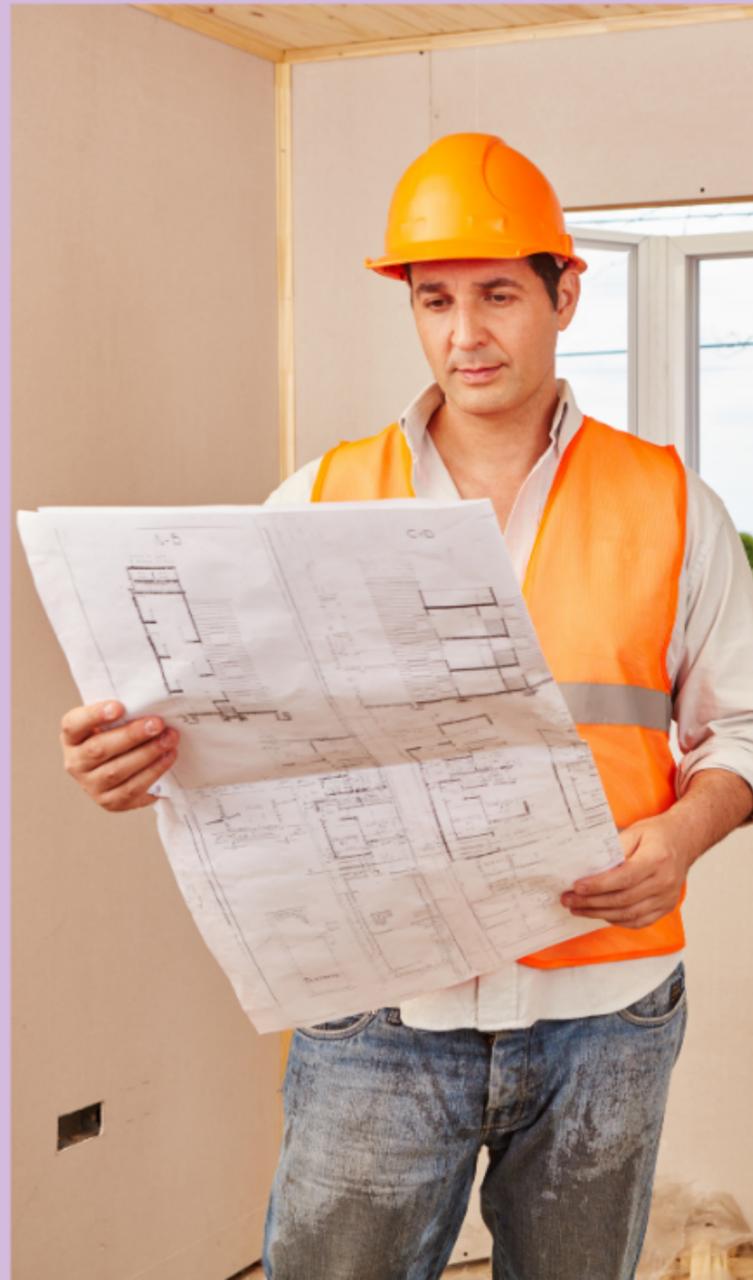
# ASHRAE 189.1: A COMPREHENSIVE GUIDE FOR SUSTAINABLE BUILDING PRACTICES

- ASHRAE 189.1 is a model code establishing minimum requirements for sustainable building practices.
- Developed by ASHRAE, the U.S. Green Building Council, and the Illuminating Engineering Society, it addresses site sustainability, water use efficiency, energy efficiency, indoor environmental quality, materials and resources, and construction and plans for operation.
- The code was introduced in 2009 and has been updated periodically to reflect technological advancements and evolving sustainability goals.
- ASHRAE 189.1 is often integrated into the International Green Construction Code (IgCC) for a robust framework for green building codes.
- It has a significant influence on various geographical regions, including the U.S., Middle East, Asia, and Europe.





# ASHRAE 189.1: A COMPREHENSIVE GUIDE FOR SUSTAINABLE BUILDING PRACTICES +



- It impacts every stage of a building's lifecycle: design phase, construction phase, operation phase, and renovation and retrofits.
- Key outcomes of implementing ASHRAE 189.1 include substantial energy savings, increased utilization of renewable energy, significant water conservation, enhanced indoor environmental quality, promotion of sustainable materials, optimized building performance through commissioning, and maximum building performance with advanced analytics.
- Implementing ASHRAE 189.1 can lead to operational cost reductions of up to 14% annually, enhancing the bottom line and increasing the overall value of a property.

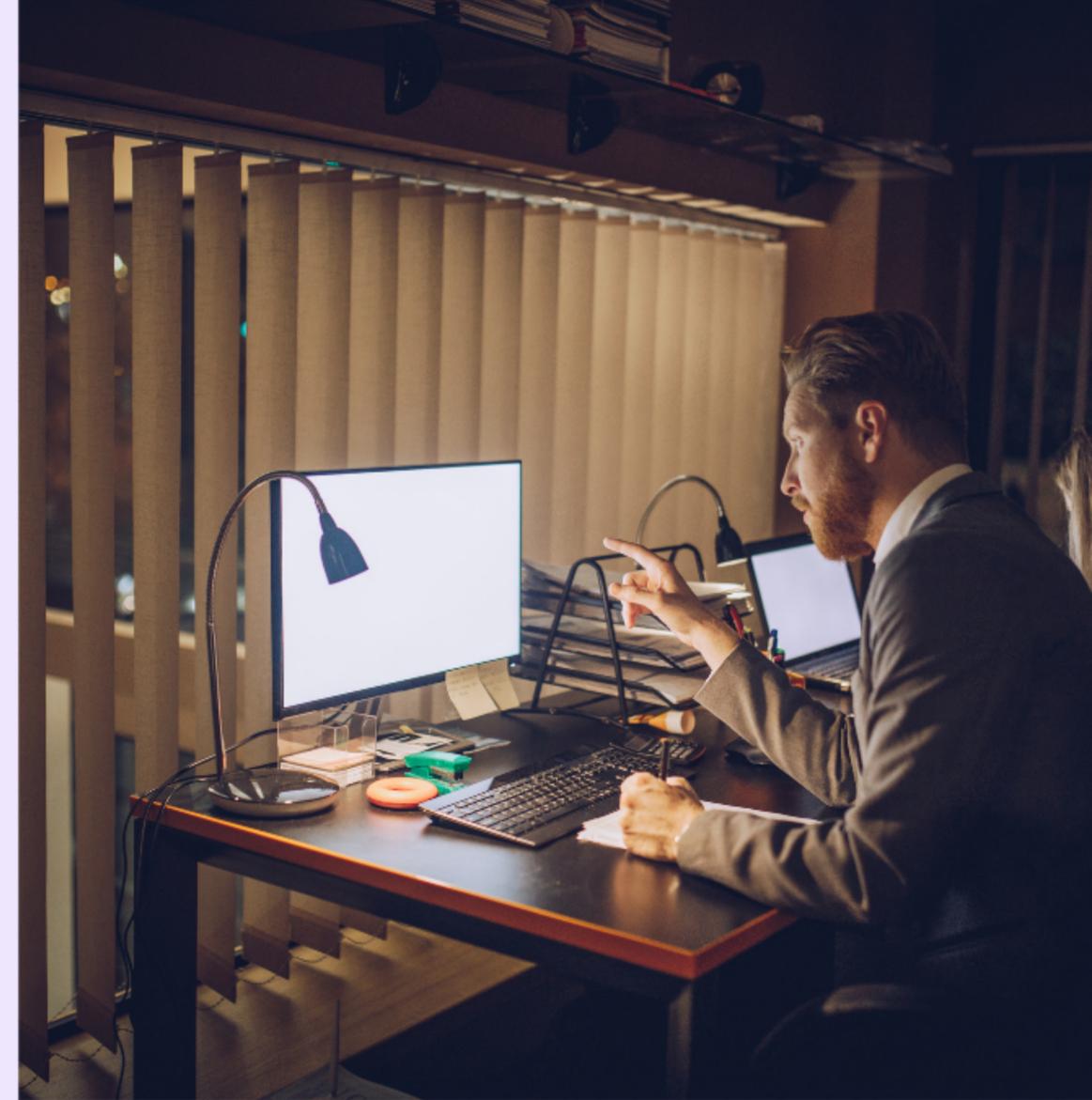
# KEY COMPONENTS OF ASHRAE 189.1

- **Resource Efficiency:** The standard establishes metrics and benchmarks for energy and water usage. It includes provisions for energy modeling to optimize energy use.
- **Indoor Environmental Quality (IEQ):** The standard emphasizes the use of low-emission materials and adequate daylighting. It promotes a well-ventilated and thoughtfully designed indoor environment.
- **Sustainable Sites:** The standard encourages strategic site selection and development practices that minimize ecological disruption. It includes considerations for stormwater management, site orientation, and habitat preservation.
- **Materials and Resources:** The standard advocates for sustainable material use, emphasizing the importance of lifecycle assessments (LCAs) in selecting materials.
- **Commissioning:** The standard ensures that all building systems perform interactively according to the design intent and the owner's operational needs.



# CONCLUSION

- Driven by regulatory requirements, economic advantages, and societal expectations.
- Implementation can lead to operational cost reductions of up to 14% annually.
- Savings come from decreased energy and water consumption, lower maintenance requirements, and increased property valu





# CONTACT US



+91 6363032722



info@beyondsmartcities.in



learn.beyondsmartcities.in



#55,HMR Layout ,Bengaluru ,India



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