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

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MODULE
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Rooms Section in Building Energy Modeling Tools

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

Room geometry is essential for calculating volume and surface area, which directly influence heating and cooling loads. Thermal properties, such as walls, windows, and roof, influence heat transfer. Orientation affects solar gains, and occupancy patterns help simulate real-world energy performance. HVAC systems are integrated within rooms, and the Rooms section allows for the specification of different HVAC systems serving each space.

Learning Objectives

- Introduction and Course Outline
- Building Energy Modeling Checklists
- Scaling an imported drawing from AutoCAD
- ASHRAE Standards and Guidelines
- **Rooms Section in Building Energy Modeling Tools**
- 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

- Crucial for simulating and analyzing building energy performance.
- Defines spatial characteristics of individual rooms or zones.
- Essential for understanding energy flows, thermal loads, and occupant behaviors.
- Key components include geometric definition, orientation and location, construction materials, internal loads, ventilation and infiltration, and thermal zones.
- Geometric dimensions influence thermal mass and air volume, affecting temperature fluctuations.
- Rooms are often grouped into thermal zones, useful for large buildings with varying occupancy schedules and energy needs.
- Essential for developing a nuanced understanding of a building's energy dynamics, enabling energy modelers to produce accurate simulations.

ROOMS TAB IN ENERGY MODELING TOOLS

- Crucial for assessing energy performance of buildings.
- Users define various characteristics of individual spaces within a building.

Defining Room Parameters

- Room Name: Names each room to reflect its function for data organization and clarity.
- Lighting Power Density (LPD): Denotes the amount of electrical power used for lighting per unit area of the room.
- Electrical Power Density (EPD): Refers to the total electrical power consumption from all non-lighting electrical devices within a room.
- Occupancy Density: Defines the number of occupants per unit area.
- Other Values: HVAC parameters, plug loads, and building envelope characteristics.





KEY COMPONENTS



- **Geometric Definition:** The geometric dimensions of a room, including length, width, height, and volume, dictate the overall thermal mass and air volume.
- **Orientation and Location:** The orientation of a room affects its exposure to solar radiation, affecting heating and cooling loads.
- **Construction Materials:** The selection of materials for the walls, floor, and ceiling of a room influences its thermal resistance, or R-value.
- **Internal Loads:** These include heat generated from occupants, lighting, equipment, and appliances within the room, contributing to the overall energy consumption and thermal dynamics of the space.
- **Ventilation and Infiltration:** Proper modeling of air movement is essential for accurately predicting energy use.
- **Thermal Zones:** Rooms are grouped into thermal zones, defined as areas that share the same heating and cooling requirements.

CONCLUSION

- Rooms section in energy modeling tools is integral for creating an accurate representation of a building's energy profile.
- Understanding these inputs and their implications is essential for professionals engaged in energy modeling and building design.



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