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SMART CITIES

MODULE
L22

Sample Building Energy Modeling Report

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

An energy modeling report typically includes an executive summary, project description, modeling methodology, assumptions, energy use results, recommendations, and appendices. The executive summary provides a concise overview of the building's energy performance, major assumptions, and potential energy-saving measures. The project description details the building's location, size, function, and design features.

Learning Objectives

- **Introduction and Course Outline**
- **Building Energy Modeling Checklists**
- **Scaling an imported drawing from AutoCAD**
- **ASHRAE Standards and Guidelines**
- **Zones Input Details in BEM 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**

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INTRODUCTION

- Energy modeling is a crucial process for understanding how design decisions impact energy use.
- ASHRAE provides guidelines and standards for energy modeling.
- The primary objective is to predict building design's energy performance under various conditions.
- ASHRAE guidelines, like ASHRAE 90.1 and ASHRAE 211, provide best practices for energy modeling.
- An energy modeling report includes an executive summary, project description, modeling methodology, assumptions, energy use results, recommendations, and appendices.

DEFINITION AND IMPORTANCE OF ENERGY MODELING

- Energy modeling uses mathematical representations and simulations to analyze and predict energy performance of systems or buildings.
- It provides insights into energy usage patterns, potential savings from efficiency measures, and the feasibility of renewable energy integration.

Importance of Energy Modeling

- Helps in design optimization, demonstrating compliance with building codes and standards.
- Aids in policy development, projecting future energy demands, and assessing the impact of energy efficiency programs.

TYPES OF ENERGY MODELS

- Whole-Building Energy Models: Simulate the energy performance of entire buildings.
- System-Level Models: Analyze the performance and efficiency of individual components.
- Statistical Models: Rely on historical data to forecast future energy consumption trends.
- Simulation-Based Models: Use computational algorithms to simulate energy flows and interactions within complex systems.

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STRUCTURE OF AN ENERGY MODELING REPORT

- Executive Summary: Summarizes the building's energy performance, major assumptions, and potential energy-saving measures.
- Project Description: Details the building being analyzed, including its location, size, function, and design features.
- Modeling Methodology: Details the modeling approach, the software used, the modeling parameters, and the specific ASHRAE standards applied.
- Assumptions: Outlines all critical assumptions, including weather data, occupancy patterns, equipment efficiency, and operational schedules.
- Energy Use Results: Presents the energy consumption results derived from the model, often including graphical representations and a breakdown of energy use by systems.
- Recommendations: Provides actionable recommendations for improving energy efficiency, such as upgrading the HVAC system to a variable refrigerant flow system, implementing daylighting strategies, and upgrading all lighting to LED technology.

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APPLICATIONS OF ENERGY MODELING

- Building Design and Renovation: Simulate various design alternatives to identify the most energy-efficient solutions.
- Energy Audits and Retrofits: Assess current energy usage and identify opportunities for improvement.
- Renewable Energy Integration: Evaluate the feasibility and impact of renewable energy technologies.
- Regulatory Compliance: Simulate compliance with energy performance standards.
- Policy and Planning: Support policymakers in developing effective energy strategies.

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ENERGY PERFORMANCE ANALYSIS

AERIAL PERSPECTIVE

PROPOSED WAREHOUSE CUM OFFICE FOR M/s WALLS & FLOORS | ORION

Prepared for:

M/s WALLS & FLOORS MIDDLE EAST FZCO
Plot No. S20905, JAFZA, DUBAI, UAE

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- **ARCHITECTURAL DETAILS**
- **ARCHITECTURAL SUMMARY**
- **ZONE SUMMARY**
- **SYSTEM SUMMARY**
- **RESULTS**

APPENDIX B: PROPOSED CASE VISUAL DOE REPORTS

- **ARCHITECTURAL DETAILS**
- **ARCHITECTURAL SUMMARY**
- **ZONE SUMMARY**
- **SYSTEM SUMMARY**
- **RESULTS**

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