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Automating Complex Building Energy Modeling from Natural Language: Real-World Cases Using EPlus-LLM

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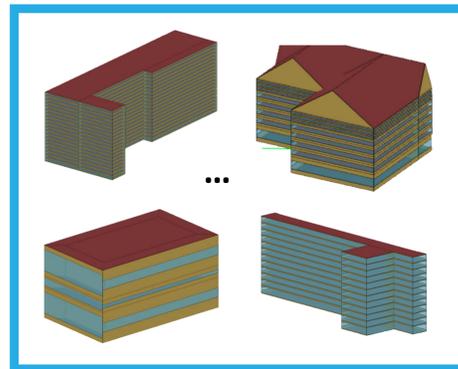
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Objectives

- 1: Provide real-world complex cases using the EPlus-LLM for automated building energy modeling.
- 2: Describe how large language models affect building design and retrofit.

Prompt of a building scenario:
 Simulate a 4-story building that is ...
 The building orientation is ...
 The building has xx thermal zones with ...
 There is a window on the xx wall...
 The window-to-wall ratio is ...
 The wall is made of xx ...
 The occupancy starts at xxx and ...
 The heating setpoint is ... during ...
 The cooling setpoint is ... during ...



Building Natural Language Description

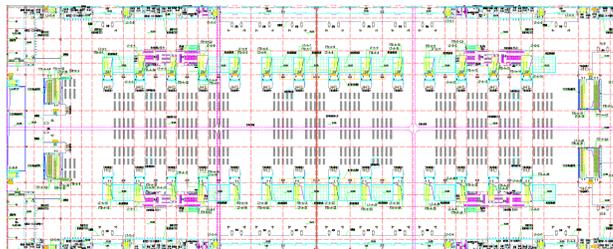
Nearly-All Building Cases

Building Applications

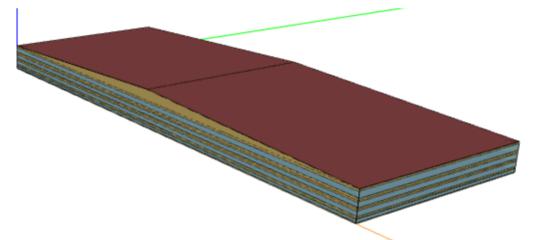
Real-World Case Study 1



Hongqiao Railway Station, Shanghai



Floor Plan

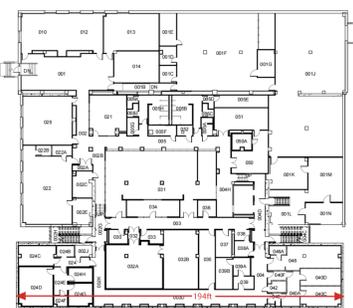


Auto-Generated Building Model

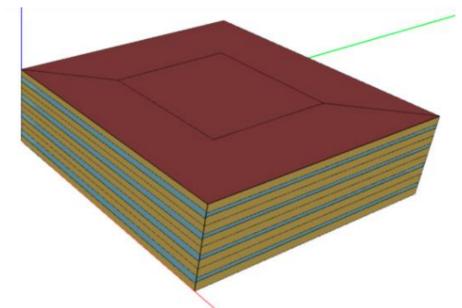
Real-World Case Study 2



CSC Building, The University of Utah

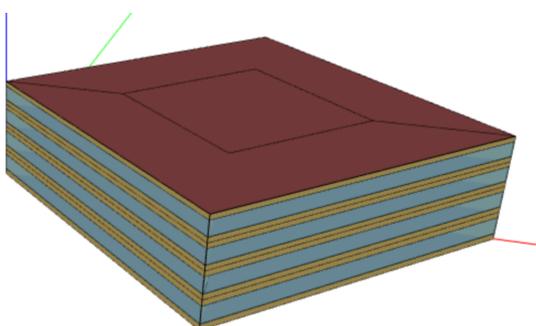


Floor Plan

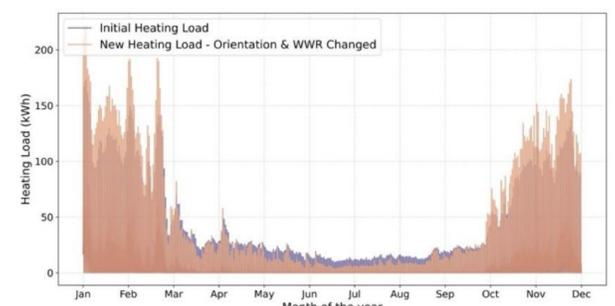
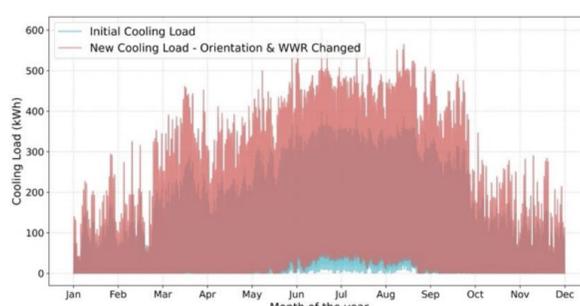


Auto-Generated Building Model

Automated Regenerated Building Scenarios



CSC Building under orientation and WWR changes.



Energy use profiles (Cooling and Heating) under the new modeling scenario