

## IMPACT OF INFILTRATION ON THE ENERGY CONSUMPTION IN HIGH-RISE BUILDINGS

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### ABSTRACT

Infiltration significantly affects the heating and cooling load of buildings. This effect is more prominent in high-rise structures where stack-induced and wind-driven air exchange can result in substantial energy consumption. Each floor of a high-rise building experiences different infiltration rates due to variable pressure difference with elevation. Current modeling techniques assume uniform infiltration throughout the building envelope and disregard the variable nature of infiltration leading to inaccurate energy predictions. Thus, accurate modeling of infiltration is essential for reliable energy predictions, as incorrect estimation can lead to improper sizing of HVAC systems. The present study considers infiltration driven factors such as stack effect and wind pressure variations in energy modeling of high-rise building and analyzes the impact of infiltration on energy consumption. A detailed high-rise building model was configured in DesignBuilder, and EnergyPlus was used as the simulation engine to quantify energy consumption under varying climatic conditions. The findings of this study will be presented and discussed.