

## Developing a Simulation-Based Optimization Framework to Perform Energy Simulation for Indian Buildings

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**Abstract :** Building sector is a major consumer of energy globally, and it has corresponding effects to the environment with respect to the carbon emissions. Given the fact that India is expected to add 40-billion square meter of new buildings till 2050, we need frameworks that help in reducing the overall energy consumption in the building sector. Even though several simulation-based frameworks that help in analyzing the building energy consumption are developed globally, in the Indian context, to the best of our knowledge, there is a lack of a comprehensive, yet user-friendly framework to simulate and optimize the effects of various energy influencing factors, specifically for Indian buildings. Therefore, this study is aimed at developing a simulation-based optimization framework to model the energy interactions in different types of Indian buildings by considering the dynamic nature of various energy influencing factors. This comprehensive framework can be used by various building stakeholders to test the energy effects of different factors such as, but not limited to, the various building materials, the orientation, the weather fluctuations, occupancy changes and the type of the building (e.g., office, residential). The results from the case study involving several building types would help us in gaining insights to build new energy-efficient buildings as well as retrofit the existing structures in a more convenient way to consume less energy, exclusively for an Indian scenario.

**Keywords :** building energy consumption, building energy simulations, energy efficient buildings, optimization framework

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