Evaluation of Emerging Building Technologies at the Urban Scale in the Context of Climate Change

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# Abstract

To address vital demands, all residential and commercial buildings are connected to traditional electricity, gas, and water supply lines, resulting in major environmental concerns. At the same time, climate change is regarded as a critical issue for humanity, with major and global environmental effects. According to the Representative Concentration Pathways 8.5 (RCP8.5) models, global surface warming is likely to exceed 2°C in 2100. This means that building constructed today must be designed to function successfully in both the current and future climates.

Emerging building technologies, such as indoor vegetation systems and double skin façade systems, have recently demonstrated tremendous potential for energy savings and better thermal comfort. However, most of that research was conducted on a local setting, without considering the climate or the urban scale weather they were exposed to. Furthermore, reducing pollutant emissions and environmental damage requires a comprehensive approach. There is a research gap in evaluating cutting-edge building technology for urban scale analyses in the context of climate change.

In this study, we will use the generated future weather data to assess the influence of climate change on emerging building technologies from urban scale. Heating and cooling requirements will be assessed.

## Literature Reviews

1. Emerging building technologies in the form of E+ simulation.
2. Future weather data.
3. Urban climate modeling.

## Methodology

Integration of the emerging technologies into urban scale climate model under the context of climate change.

## Comparison

1. Climate scenarios
   1. RCP4.5, intermediate scenarios.
   2. RCP8.5, high greenhouse gas emissions scenarios.
2. Building technologies scenarios
   1. Baseline
   2. Photovoltaics
   3. Phase change material
   4. Indoor greenery systems