

Computational Methods in Building Energy Efficiency Research

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Message from the Guest Editors

A major challenge to achieving global decarbonisation targets is building retrofitting and increasing energy efficiency. Meeting net-zero targets will require increasingly impractical rates of deployment across a range of energy-efficient retrofit measures, e.g., heat pumps, insulation, glazing, etc. Computational methods that are utilized in research in the built environment is a rapidly emerging field. Large-scale, data-driven solutions are becoming essential for analysis and optimisation of retrofit interventions.

Furthermore, while a body of work is emerging to address retrofitting and other challenges in meeting net-zero decarbonisation targets in the built environment, considerations of future sustainability are largely absent. With large shifts in climate and weather patterns predicted to occur over the next few decades, considering the effects of future climate on the choice and sustainability of energy-efficient retrofitting is becoming increasingly important. Predictive modelling incorporating future climate scenarios is of particular interest for this Special Issue.



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Message from the Editor-in-Chief

Current urban environments are home to multi-modal transit systems, extensive energy grids, a building stock, and integrated services. Sprawling neighborhoods are composed of buildings that accommodate living and working quarters. However, it is expected that the cities and communities of the future will face complex and enormous challenges, including maintenance, interconnectivity, resilience, energy efficiency, and sustainability issues, to name but a few. A smart city uses advanced technologies and a digital infrastructure to improve the outcomes in every aspect of a city's operations. A smart building optimizes the experience of occupants, staff, and management by using a modern and connected environment. Innovations in technology that can bring dramatic improvements to design, planning, and policy are critical in developing the cities and buildings of the future.

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