

Low-Carbon Buildings and Urban Energy Systems

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Message from the Collection Editors

An increasing carbon footprint of buildings is an urgent environmental, social, and economic issue requiring a holistic solution involving advanced architectural designs, green constructions, efficient building services systems, renewable applications, control technologies and management strategies. To fulfil carbon neutrality targets around the world, it is necessary to integrate a sustainable built environment with efficient conversion, conservation, and storage technologies in urban energy systems via smart utility grids. Given the complicated interaction among buildings, the environment, and urban energy systems, a synergy of urban planning, architectural design, building engineering, as well as energy systems should be achieved to incorporate feasible innovative technologies to reduce carbon emissions from buildings and urban communities. In particular, emerging green material, digital design, artificial intelligence, and automatic control technologies can be applied to optimize the stability, reliability, and resilience of the urban energy distribution network (e.g., buildings, communities, transportation and utilities) and reduce its lifecycle environmental impact.



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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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