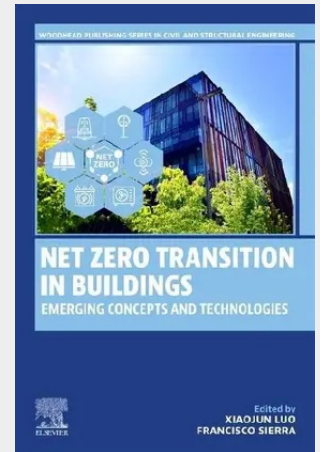


Net Zero Transition in Buildings

Emerging Concepts and Technologies

Energy efficiency is an integral part of making buildings greener, which has become a key issue for both developing and developed countries. Scholars, researchers, and practitioners from a number of interconnected disciplines have all shown increasing interest in the topic, and studies into buildings' energy performance and cutting-edge measures to achieve government-steered commitments to reduce global greenhouse gas emissions over the coming decades have proliferated. *Net Zero Transition in Buildings, Emerging Concepts and Technologies* is a timely, up-to-date reference resource on design, operation, and management of technology-enhanced equipment and advanced strategies that put guidance and attention toward sustainably responsible energy use within and around buildings at their core. The volume's contents have been subdivided into sections, additionally proffering a deliberately structured flow throughout all chapters which is aimed at quickly getting readers at all levels up to speed or providing them with answers to key questions. Part I discusses physical solutions, namely different types of devices that harness renewable energy resources, store energy, or combine cooling, heating, and power systems; part II covers digital tools (e.g., AI, blockchain, big data, IoT, and digital twins) that can aid with carbon emissions' accounting, predicting and optimizing energy consumption patterns, and more; and part III investigates the very latest technical concepts and approaches for energy self-producing built environment assets and a variety of integrated best practices for the construction sector as a whole. Furthermore, as the net zero transition in this context is a concept that has multidimensional pillars, part IV concludes this sought-after knowledge compilation by making it more comprehensive, well-rounded, and useful for audiences in academia and industry alike.

of solutions to achieve zero carbon in the field of building and construction. This book provides an update on new technologies and emerging approaches that can support and promote the energy transition and the reduction of greenhouse gas emissions in the built environment, both in individual buildings and groups of buildings. This book presents real-world case studies and expert insights on how to apply a wide range of cutting-edge digital technologies, such as artificial intelligence, machine learning, blockchain, genetic algorithms, and computer vision, as well as energy-efficient devices like heat pumps, energy storage systems, adsorption chillers and dehumidification systems, liquid-flow windows, solar and wind power systems, green roofs, cogeneration systems, and internet of things. It also explores emerging concepts such as plus energy building, positive energy block, integrated building information systems and life cycle assessment, integrated demand and supply side management, peer-to-peer energy sharing and embodied carbon reduction, which are already beginning to emerge as solutions for achieving a zero-carbon built environment in the near future.



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