Chapter 11
Redefining Sustainability in Building Practices in Circular Construction Process

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ABSTRACT

This chapter explores the connection between circular construction principles and energy-efficient design strategies to examine the impact on environmental stewardship and resource optimization. It also discusses the economic viability, regulatory frameworks, and case studies of circular construction and energy-efficient design.

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Sustainable architecture trends, including smart technologies, circular economy principles, and public policy, are also explored. The interdisciplinary collaboration and innovation transforming architectural practices are illustrated to meet current needs and promote environmental and societal well-being. A comprehensive sustainable architecture approach, focusing on circular construction principles and energy-efficient design strategies, is empathized with to tackle environmental issues and create resilient communities.

INTRODUCTION

The concept of sustainability is increasingly being recognized in contemporary architecture and construction, since circular building methods are displacing the conventional linear "take, make, dispose" paradigm. In an effort to reduce the influence that buildings have on ecosystems and natural resources throughout the course of their lives, this shift places an emphasis on longevity, resource efficiency, and environmental responsibility. A ground-breaking method called circular building transforms the way materials are found, utilized, and recycled in architectural projects. It integrates the ideas of reduce, reuse, and recycle with the goals of promoting sustainable building practices, extending the lifecycles of materials, and minimizing waste—all of which lessen the demand on building costs and schedules(Melella et al., 2021).

A sustainable building method known as "circular construction" promotes the use of prefabricated, modular components that are simple to deconstruct and reuse when their useful lives are over. This strategy prioritizes durable materials and disassembly design, which encourages adaptation and lowers demolition waste. As a result, buildings last longer and are more resilient to shifting economic and environmental situations. The sustainability benefit of energy-efficient design solutions and circular construction is enhanced by their intimate relationship. Through the use of passive strategies, effective insulation, and the integration of renewable energy sources, energy-efficient design lowers energy consumption during building operations. These tactics, when used in tandem, maximize building performance while lowering operating expenses and the environmental impact(Núñez-Cacho et al., 2018).

The increasing prevalence of circular building processes can be attributed to legislative, economic, and environmental factors. Companies are beginning to see the financial advantages of sustainable construction, including lower operating expenses and increased corporate social responsibility. The trend toward circular construction is being accelerated by government and local policies that support green building certifications and strict environmental regulations. Circular practices are

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