

Special Issue Reprint

Carbon-Neutral Infrastructure

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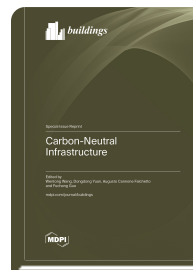
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This reprint explores innovative and sustainable solutions for transport infrastructure development under a global carbon-neutral framework. With climate action growing increasingly urgent, nations worldwide are actively pursuing greenhouse gas emission reductions across all sectors. Transportation infrastructure—particularly road systems—represents a major carbon source due to extensive non-renewable resource consumption throughout its lifecycle. As key elements of road systems, asphalt and cement generate significant emissions throughout their lifecycle.

To address these challenges, it is crucial to reduce non-renewable material use, improve construction efficiency, enhance material recycling, and accelerate low-carbon technology deployment. These efforts are vital for reducing transportation's environmental impact while advancing carbon neutrality and sustainable development.

Following circular economy principles, innovative strategies are being implemented to lower the carbon footprint of infrastructure. Key approaches include using industrial by-products as concrete substitutes, developing energy-efficient asphalt technologies like warm-mix and bio-based binders, and optimizing recycling processes. These technologies not only cut emissions but also improve infrastructure durability and lifecycle performance.

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