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DECARBONISATION STRATEGIES IN GREEN LOGISTICS AS A KEY FACTOR OF THE GREEN ECONOMY

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Abstract

The aim of this literature synthesis is to analyse and critically evaluate existing approaches for reducing CO₂ emissions in logistics processes, contributing to environmental sustainability and the development of a green economy. The research adopts an integrated descriptive-analytic approach based on the synthesis and comparative analysis of existing empirical evidence on logistics decarbonisation strategies. The study systematises and compares published estimates of emission reductions associated with different technological and organisational solutions in logistics, as reported in the current scientific and analytical literature. The literature synthesis highlights key decarbonisation strategies that can significantly reduce the carbon footprint of logistics processes. The synthesis of the literature reveals that optimising transport routes can reduce CO₂ emissions by 15–20%, achieving reductions of up to 10–15 kg per 100 km travelled. Switching to clean transport, including electric vehicles and hydrogen trucks, provides emission reductions of 40–60%, equivalent to reductions of up to 100 kg of CO₂ per 100 km. Analyses of digital technologies have shown that the introduction of the Internet of Things, artificial intelligence and blockchain can further reduce emissions by 5–10% through increased transparency and monitoring of supply chains. The development of multimodal transport, especially using rail and water transport, reduces emissions by 30–45% compared to road transport. Existing studies indicate that greening warehouse infrastructure using energy-saving technologies reduces the carbon footprint by 5–10%. The development of reverse logistics and the introduction of circular economy principles can significantly reduce waste and increase recycling rates.

Key words: carbon footprint, digitalization, energy-saving technologies, multimodal transport, transport optimization

Received: June, 2025; Revised final: March, 2026; Accepted: April, 2026

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