

Strategic Value and Practical Challenges of the Dismantling Industry in the Context of Circular Economy

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Abstract

Against the backdrop of increasing global resource constraints, rising supply risks of critical minerals, and the rapid transition toward a circular economy, enhancing waste resource utilization has become a critical issue for resource security and green transformation. As a key conversion link between waste resource recovery and recycled material utilization, the dismantling industry determines not only the efficiency of resource separation and value recovery but also the resilience of circular economy systems and industrial supply chains. However, existing studies have mainly focused on recycling models, recovery technologies, and environmental benefits, while the strategic role and development constraints of dismantling industries remain insufficiently explored. Based on circular economy theory and an industrial chain perspective, this study investigates the strategic value and practical challenges of the dismantling industry through literature review, industrial chain analysis, and regional case studies. The findings reveal three strategic functions of dismantling industries: first, improving secondary resource supply capacity to enhance critical mineral security; second, promoting the transformation of waste resources into recycled materials to strengthen industrial circularity; and third, realizing value reconstruction through high-value resource utilization to support green industrial development. Nevertheless, the industry currently faces several structural challenges, including the mismatch between rapidly growing waste resources and insufficient standardized dismantling capacity, the conflict between high-value utilization requirements and low-end processing modes, and inadequate industrial coordination and regional imbalance. This study demonstrates that the dismantling industry has evolved from a traditional environmental protection sector into a strategic gateway industry within circular economy systems. Promoting its sustainable development requires technological innovation, improved recycling systems, stronger industrial coordination, and regionally specialized development strategies. The study contributes to a deeper understanding of the strategic positioning of dismantling industries in circular economy transitions and provides theoretical and practical implications for building resource-secure circular economy systems.

Keywords

Circular Economy, Dismantling Industry, Critical Minerals, Resource Security, Industrial Chain, Secondary Resources