

## Circular Economy Initiatives in Denmark for the Recycling of Household Plastic Wastes

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**Abstract :** This paper delves into the intricacies of recycling household plastic waste within Denmark, employing an exploratory case study methodology to shed light on the technical, strategic, and market dynamics of the plastic recycling value chain. Focusing on circular economy principles, the research identifies critical gaps and opportunities in recycling processes, particularly regarding plastic packaging waste derived from households, with a notable absence in food packaging reuse initiatives. The study uncovers the predominant practice of downcycling in the current value chain, underscoring a disconnect between the potential for high-quality plastic recycling and the market's readiness to embrace such materials. Through detailed examination of three leading companies in Denmark's plastic industry, the paper highlights the existing support for recycling initiatives, yet points to the necessity of assured quality in sorted plastics to foster broader adoption. The analysis further explores the importance of reuse strategies to complement recycling efforts, aiming to alleviate the pressure on virgin feedstock. The paper ventures into future perspectives, discussing different approaches such as biological degradation methods, watermark technology for plastic traceability, and the potential for bio-based and PtX plastics. These avenues promise not only to enhance recycling efficiency but also to contribute to a more sustainable circular economy by reducing reliance on virgin materials. Despite the challenges outlined, the research demonstrates a burgeoning market for recycled plastics within Denmark, propelled by both environmental considerations and customer demand. However, the study also calls for a more harmonized and effective waste collection and sorting system to elevate the quality and quantity of recyclable plastics. By casting a spotlight on successful case studies and potential technological advancements, the paper advocates for a multifaceted approach to plastic waste management, encompassing not only recycling but also innovative reuse and reduction strategies to foster a more sustainable future. In conclusion, this study underscores the urgent need for innovative, coordinated efforts in the recycling and management of plastic waste to move towards a more sustainable and circular economy in Denmark. It calls for the adoption of comprehensive strategies that include improving recycling technologies, enhancing waste collection systems, and fostering a market environment that values recycled materials, thereby contributing significantly to environmental sustainability goals.

**Keywords :** case study, circular economy, Denmark, plastic waste, sustainability, waste management

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