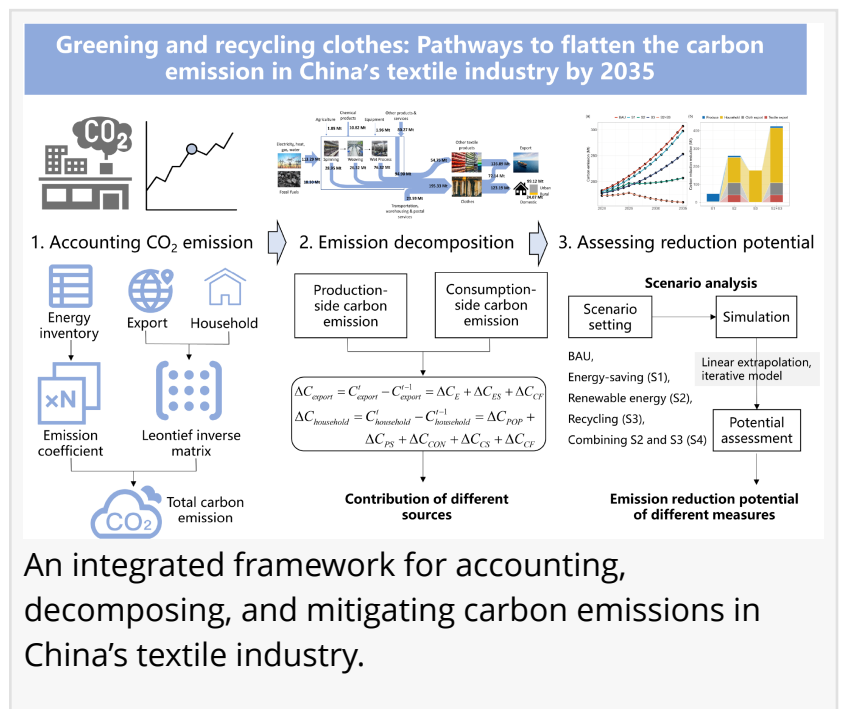


Can greener clothes flatten carbon emissions? New pathways for china's textile industry

GA, UNITED STATES, March 2, 2026 /EINPresswire.com/ -- The textile and apparel industry is one of the most carbon-intensive sectors embedded in modern lifestyles, yet its emissions remain poorly understood across the full supply chain. A new study provides a comprehensive assessment of [carbon emissions](#) linked to textile production, consumption, and trade over nearly two decades, revealing that rising demand—rather than manufacturing alone—drives most emissions. By mapping carbon flows from raw materials to households and exports, the research identifies critical emission hotspots and evaluates multiple mitigation pathways. The findings suggest that combining renewable energy adoption with expanded clothing recycling could reverse long-term emission growth, offering a realistic pathway to stabilize and reduce carbon emissions while sustaining economic activity.



As global demand for clothing continues to rise, the textile and apparel industry has become a significant contributor to climate change. In China, the world's largest textile producer and exporter, rapid urbanization, income growth, and shifting consumption patterns have driven a surge in apparel demand. Traditional studies often focus on factory-level energy use, overlooking emissions embedded in supply chains, exports, and household consumption. This fragmented perspective limits the effectiveness of mitigation strategies. Moreover, fast fashion and short garment lifespans exacerbate resource use and waste. Based on these challenges, there is an urgent need to conduct in-depth research that captures the full carbon footprint of the textile industry and identifies scalable pathways for emission reduction.

Researchers from Nanjing University, in collaboration with international partners, reported on January 9, 2026, in Engineering Environment a comprehensive analysis of carbon emissions in China's textile and apparel industry. Using national household consumption data and supply-

chain input-output modeling, the team examined emission trends from 2000 to 2018 and projected future mitigation scenarios through 2035. Their study reveals how production, consumption, and exports jointly shape the sector's carbon footprint and highlights practical strategies—particularly renewable energy and clothing recycling—to curb emissions while supporting sustainable industrial development.

The analysis shows that demand-side forces dominate carbon emissions in China's textile industry. Household consumption and exports together account for roughly 85% of total emissions growth, far outweighing the contribution from direct energy use in factories. Urban households, in particular, generate more than four times the carbon emissions of rural households due to higher clothing consumption, underscoring the climate impact of lifestyle changes.

By constructing detailed carbon flow diagrams, the study identifies wet processing, electricity use, and long, fragmented supply chains as major emission hotspots. While electrification has reduced emissions from fossil fuels, carbon embodied in upstream sectors—such as chemicals, transportation, and logistics—continues to rise.

To explore mitigation pathways, the researchers modeled five future scenarios. Energy-saving technologies alone delivered limited reductions, while large-scale renewable energy adoption significantly lowered emissions by reducing carbon intensity across the entire supply chain. Clothing recycling emerged as another powerful lever, as extending garment lifespans directly reduces the need for new production. Most notably, a combined strategy integrating renewable energy and recycling could reduce total emissions by nearly 10% compared with a business-as-usual trajectory, effectively flattening long-term emission growth.

"This study shows that decarbonizing the textile industry is not just a technological challenge, but also a consumption challenge," said the study's corresponding author. "Focusing only on factories misses the bigger picture. Our results demonstrate that household demand, urban lifestyles, and export-oriented production play decisive roles in driving emissions. By aligning clean energy transitions with circular economy strategies—especially clothing recycling—we can achieve meaningful emission reductions without sacrificing economic vitality. These insights provide a scientific foundation for designing more effective and balanced climate policies."

The findings have important implications for policymakers, industry leaders, and consumers. For governments, the study highlights the need to integrate demand-side measures—such as promoting clothing reuse and recycling—into climate strategies for the textile sector. For industry, it underscores the value of transitioning to renewable energy while redesigning supply chains to be shorter and more efficient. For consumers, the research quantifies how everyday clothing choices contribute to carbon emissions, reinforcing the climate benefits of longer garment lifespans. Together, these pathways suggest that a shift toward greener production and more responsible consumption can transform textiles from a climate liability into a key contributor to a low-carbon future.

References

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