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Potential for future reductions of global GHG and air pollutants from circular waste management systems

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The rapidly rising generation of municipal solid waste jeopardizes the environment and contributes to climate heating. Based on the Shared Socioeconomic Pathways, we here develop a global systematic approach for evaluating the potentials to reduce emissions of greenhouse gases and air pollutants from the implementation of circular municipal waste management systems. We contrast two sets of global scenarios until 2050, namely baseline and mitigation scenarios, and show that mitigation strategies in the sustainability-oriented scenario yields earlier, and major, co-benefits compared to scenarios in which inequalities are reduced but that are focused solely on technical solutions. The sustainability-oriented scenario leaves 386 Tg CO₂eq/yr of GHG (CH₄ and CO₂) to be released while air pollutants from open burning can be eliminated, indicating that this source of ambient air pollution can be entirely eradicated before 2050.