

Reducing Landfill Flows from Office Furniture: LCA of the Davies Reman Answer System

Allen Luccitti: Golisano Institute for Sustainability (RIT-GIS), ajlasp@rit.edu

Miko Buenk: (RIT-GIS)

Ava Labuzetta: (RIT-GIS)

Kimberly Bawden: (RIT-GIS)

Office furniture accounts for a significant share of the U.S. EPA estimated 9.7 million tons of furniture disposed of each year, creating a major source of durable-goods landfill flows and a large opportunity for diversion.^{1 2} Davies Office's Reman Answer office system advances circularity by prioritizing reuse, remanufacture, and extension of embodied material value in office furniture. Structural steel frames, connectors, and many other components from returned Steelcase cores are retained and restored, reducing the need for new raw-material production and conserving embedded energy and materials.

This paper applies life cycle assessment (LCA) as the primary analytical method and uses a third-party verified Environmental Product Declaration (EPD) for the Davies remanufactured (reman) Answer office systems to establish transparent, reproducible performance benchmarks and to demonstrate how EPDs can verifiably substantiate circular-economy outcomes.

The analysis combines EPA-derived disposal tonnages with product-level material compositions, remanufacturing process inventories, and EPD-verified impact factors. Life cycle assessment frames the evaluation so embodied impacts, including Global Warming Potential and Ozone Depletion, material conservation, and avoided upstream production burdens are quantified on a consistent basis.

¹ U.S. Environmental Protection Agency. (2025). Durable goods: Product-specific data. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/durable-goods-product-specific-data>

² U.S. Environmental Protection Agency. (2014). Memorandum: Revised municipal solid waste residential/commercial split (rev. Oct. 24, 2014) [PDF]. https://www.epa.gov/sites/default/files/2016-01/documents/rev_10-24-14_msw_residential_commercial_memorandum_7-30-13_508_fnl.pdf

Operational workflows are described in detail: collection of decommissioned assets; graded inspection and triage to identify reusable subsystems; cleaning, repair, and surface recoat processes; selective supplementation with new materials to meet performance and aesthetic requirements; and reassembly into systems that perform equal to or better than equivalent new products. Throughput metrics, historical diversion performance, and typical system variants are summarized to quantify scale and annual tonnage diverted from landfill.

Material composition analysis shows a large fraction of typical office systems is steel, often close to 60% of structural mass, making these systems especially amenable to remanufacture and reuse. Combining material mass, remanufacturing inventories, and EPD impact factors demonstrates measurable reductions in embodied emissions and landfill flows when the Davies Reman model is applied at scale.

Centering life cycle assessment and an independently verified EPD provides a rigorous, transparent evidence base that the Davies remanufacturing model demonstrates potential to save 730,000 Metric Tons of CO_{2eq} and 286,000 Metric Tons of material diverted from landfill in a decade.