MITOS
Design Out Waste Strategy
Living Document v. 1

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Introduction

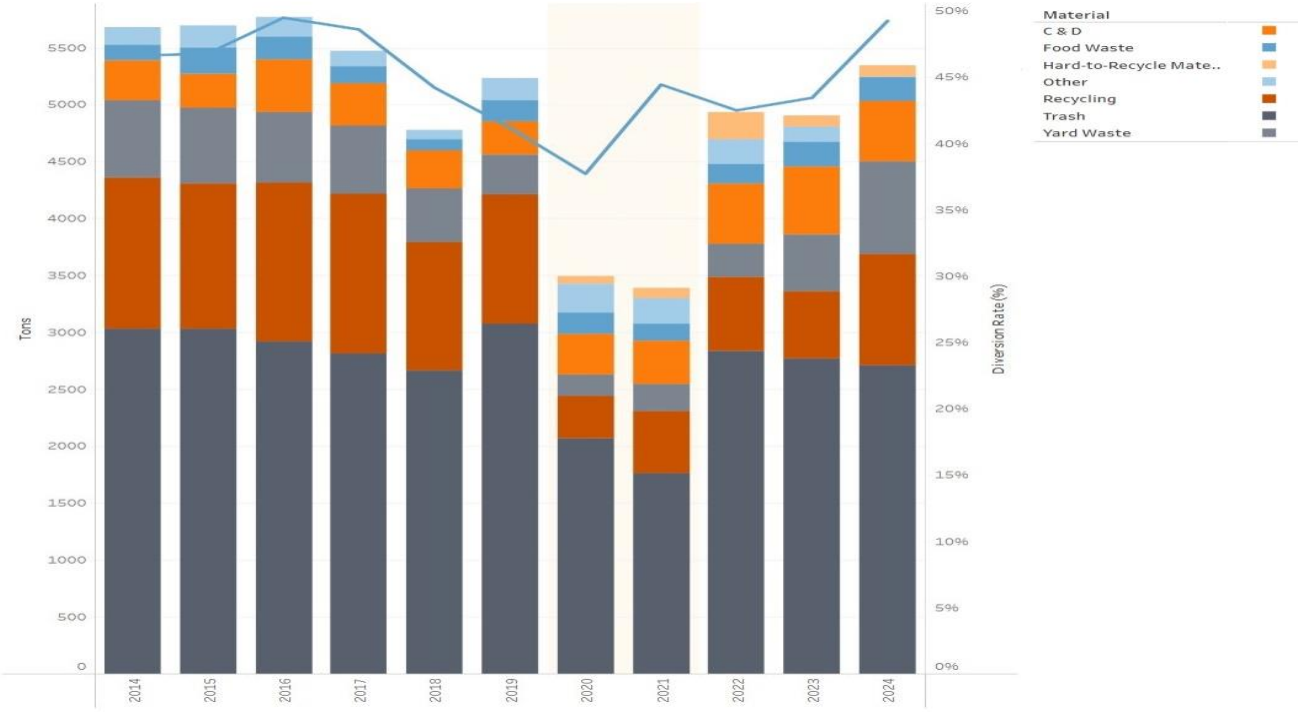
The MIT Office of Sustainability's (MITOS) Design Out Waste Strategy seeks to eliminate waste at its source, moving away from a "take, make, waste" model toward a circular economy for MIT—one that minimizes its own resource consumption and waste generation; promotes research and innovation in circular design and systems; and educates students, faculty and staff on circular principles. This document summarizes the strategy, provides grounding principles and highlights some of the resources that can be used by individuals, departments, labs, centers and schools for designing out waste at MIT.

From Linear to Circular: Rethinking Material Flows on Campus

The MITOS Design out Waste strategy seeks to create a circular campus that integrates a range of efforts to reduce waste, extend the life of materials through reuse and reprocessing, and decreases the need for new resource extraction.

Imagine the campus serving as a local test bed for a global circular economy, which aims to keep materials in use for as long as possible, and when materials are no longer necessary, ensuring they are either given a new life through reuse and recovery or responsibly returned to the environment without harm. This program seeks to educate, engage and catalyze the community in developing, planning, and implementing a more circular system.

MIT has been tracking the amount of waste generated on campus since 2011. This data is accessible via the "Material Matters" dashboard (example below), is updated annually, shows waste totals across multiple streams and can be accessed with an MIT ID login. To meet MIT's 2030 30% reduction goal, identified in MIT's Fast Forward Plan for Climate Action, MIT needs to reduce its trash 924 tons annually by 2030.



Waste and Greenhouse Gas Emissions

Waste processing via landfills in the U.S. is the third largest source of methane release—a potent greenhouse gas which is nearly 28 times more efficient than carbon dioxide at trapping greenhouse gasses in the atmosphere (EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks, 2023). While half of the campus's waste goes to landfills, this material accounts for about 80% of the campus's solid waste-related greenhouse gas emissions.

Campus waste audits show that up to 50% of materials in trash bins are sorted incorrectly, and food waste makes up about 30% of what is thrown away. Improving waste sorting and reducing food waste are the most effective ways to lower waste-related emissions (see Campus Waste Audit data located in MIT Sustainability Datapool (Kerberos login required).

Key Principles and Strategies

The Design Out Waste program is grounded in the circular economy principles known as the **R9 Framework**—an expanded version of the traditional "three R's" (Reduce, Reuse, Recycle). The R9 principles broaden the approach to include **Refuse, Rethink, Repair, Remanufacture, and Recover**, creating a more comprehensive strategy for eliminating waste and maximizing resource value.

Circular Resource Strategies

- **Reduce resource consumption**: Extend the lifespan of materials through repair, refurbishment, and reuse; prioritize pre-owned goods; and adopt minimalist practices to limit unnecessary purchases.
- **Repurpose and reuse**: Redirect functional items to other organizations or find creative new uses to avoid disposal.
- **Build circular systems**: Establish campus processes that route surplus materials into reuse channels and prioritize purchasing refurbished or recycled goods.
- **Advance research and innovation**: Support research and pilot projects that transform used materials into higher-value products.
- **Promote recycled content**: Advocate for the use of recycled and repurposed products to reduce reliance on virgin resources.
- **Ensure supplier accountability**: Work with suppliers who embrace circular production practices and take responsibility for materials at the end of a product's life.

Recommended Strategies: Building a More Circular MIT

MIT already has a variety of systems that demonstrate how to design out waste. Scaling these efforts into a fully circular campus will require coordinated, systemic strategies, including:

1. Prioritizing purchases of refurbished products and items made from recycled materials.
2. Expanding food waste collection infrastructure and increasing participation in food waste diversion programs, including adoption of centralized waste stations throughout campus.
3. Growing the **Rheaply** marketplace for free goods exchange to include community and nonprofit partners.
4. Introducing reusable dishware systems campus-wide, potentially adopting successful revenue models such as charging for disposable items (e.g., Boston University).
5. Increasing participation in lab material sharing programs and making surplus furniture easier to locate and claim.
6. Expanding student-run reuse initiatives and organizing regular campus-wide swap events.
7. Broadening campus lending libraries to include a wider range of durable goods.
8. Continuing to align and scale campus initiatives with the recommendations and principles of the City of Cambridge Zero Waste Master Plan

Next Steps

Departments, labs, centers, and institutes are encouraged to adopt policies and practices that align with the principles and strategies outlined above. Existing tools to support these efforts are summarized below.

Existing Tools and Resources Promoting a Circular MIT

♻️ Reuse Programs

- **Rheaply Sharing Platform:** An online marketplace for the MIT community to find reusable or salvageable equipment and supplies.
- **Swapfest**: This is a place to buy, sell, and swap amateur radio, electronic, and computer equipment. Hams and non-hams alike are welcome.
- **Reuse Swap Shelves:** Informal to formalized sharing shelves found across campus, initiated by MIT departments, labs, centers, and institutes (DLCIs).
- **Choose to Reuse:** A Working Green Committee event that periodically holds free swap events for the MIT community; recently co-hosted with MIT Open Space Programming.
- **Reuse MIT Email List:** A long-running email listserve that facilitates the reuse and sale of a wide range of items.
- **The Furniture Exchange (FX):** A program run by the MIT Women's League that sells discounted used furniture and household goods to support MIT scholarships.
- **MIT's Clothing Thrift Shop "Infinite Threads":** A student-led initiative that collects and sells donated clothing through pop-up sales.
- **Trash 2 Treasure:** A student-run group that collects items from dorms before spring move-out and resells them at a discount during the fall semester.
- **Kendall Square Book Exchange:** Seven free public book exchanges in Kendall Square that welcome people to donate and claim books.
- **Collective Reuse:** A designated space in the Department of Architecture where students can exchange and reuse model-making materials.

🍽️ Food and Beverage Initiatives

- **Green Boxes:** A program that provides MIT meal plan holders with a reusable eco-clamshell container for taking meals from dining halls.
- **Bulk Coffee Service (Without Cups):** Systems in various departments that provide coffee without single-use cups, encouraging the use of personal mugs.
- **Mug, Cups, and Dishware Sharing Programs:** Reuse-sharing systems, like the one in the Office of Sustainability, that reduce single-use item waste.
- **Container-Free Flavored Water Vending Machines:** Water dispensers in various campus locations that replace plastic bottles and reduce the carbon footprint.
- **Water Fountains and Bottle Refilling Stations:** A growing inventory of fountains and refilling stations across campus to reduce the need for plastic bottles.
- **The "Food Cam":** A MIT Media Lab tool that sends automatic alerts to notify people when food becomes available, ensuring timely access and reducing waste.
- **Grapevne:** A real-time food recovery app (in pilot test stage on campus) that makes surplus food visible and accessible.

- **Food Sharing Notifications:** An email listserve that facilitates a robust culture of sharing food across campus.
- **Sustainable Events:** The MIT Office of Sustainability provides a checklist and self-certification tools to help plan events that reduce waste.
- **Retail Coffee Mug Discounts and Bulk Groceries:** A map of local businesses that offer discounts for using personal coffee mugs or allow bulk grocery purchases in personal containers.
- **Food Waste/Food Scrap Collection:** A program that collects food waste to be converted into biogas, aligning with state regulations and climate goals.
- **MIT Waste Watchers:** A student-led group that provides education on best waste practices by staffing sorting stations and organizing workshops.

Infrastructure and Materials

- **Centralized Waste Stations:** A new model for centralized waste bin systems with standardized MIT signs and labels being implemented in new and existing buildings.
- **MIT Waste Wizard:** An online tool that helps the MIT community identify preferred reuse, recycling, and disposal options for hundreds of materials.
- **Dishwashing Equipment:** An initiative that encourages departments to install and manage dishwashers to support the use of reusable dishware.
- **Circularity in Building Materials:** A program that advances methods for selecting healthy and sustainable materials for MIT building and renovation projects, using various product certifications.
- **Carpet Recycling:** A program that offers MIT departments the option of recycling old carpeting during renovations, with the material being remanufactured into other products.
- **Furniture:** A program that encourages DLCIs to purchase refurbished and recycled furniture from MIT's preferred suppliers. The Rheaply platform also assists departments in sourcing high-quality, used institutional furniture from a regional market.

Specialty Waste and Chemical Management

- **Textile Donation and Recycling:** On-campus bins for donating used or damaged clothing, textiles, and shoes located between Building 46 and Albany Garage; Westgate Lot across from Next House, Building W71
- **Special Waste Streams:** The Facilities Department manages special collection areas for items like polystyrene, plastic film, batteries, and small electronic waste.
- **EH&S Chemical Sharing Tool:** A program that allows chemical users to share unwanted and unused chemicals with others on campus, preventing disposal.
- **Pipette Tip Circularity:** A recycling program for labs that collects pipette tips for remanufacturing into sharps containers, reducing waste and creating a closed loop.