Enhancing Biohazardous Waste Management @ MIT

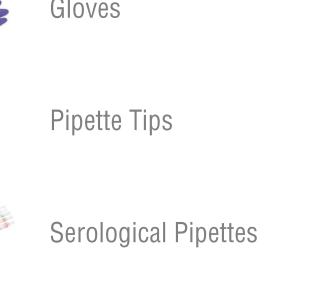
To examine the policies, procedures, and behaviors that impact biohazardous waste disposal in research laboratories on MIT campus and identify best practices for laboratories to reduce their environmental footprint.

Problem

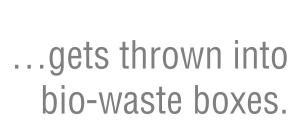
MIT campus disposes approximately 340 tons* of biohazardous waste every year, and efforts to decrease this amount are substantially challenging due to lack of metrics, data & accountability.

Current Biohazardous Waste Management Process on Campus





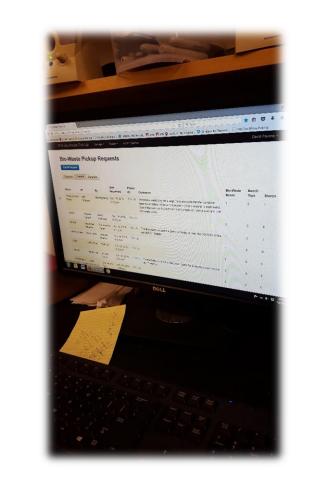
Falcon Tubes





2 Request & Collection

Requests for pick-up are made by research labs...



...and boxes are collected by the EHS Technicians.



3 Transport & Treatment

The boxes are then sealed,...



...shipped via Stericycle trucks,..



Recommendation: Multi-Sensory Bio-waste Box Prototype

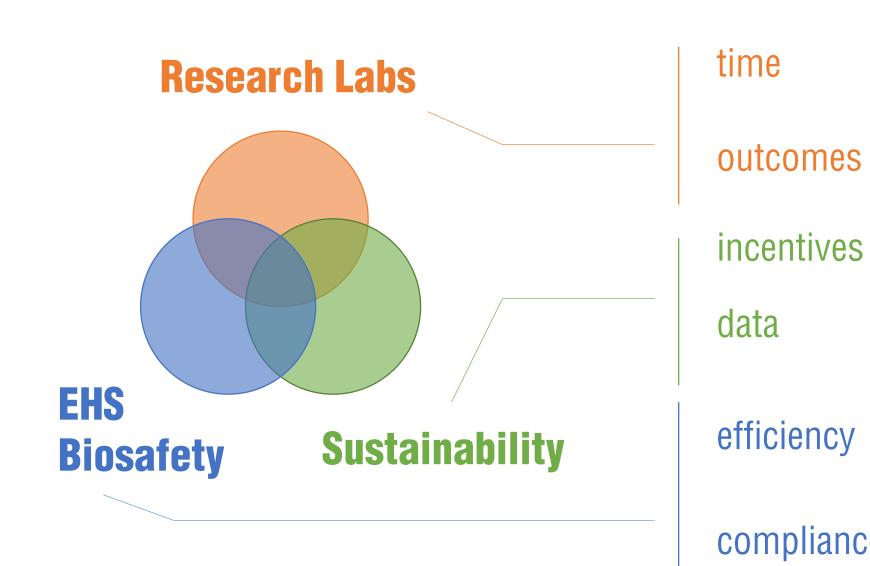
The bio-waste box was modified with a multi-sensor platform that would feed data

...and autoclaved to be incinerated.



Research Findings & Value Analysis

20+ hours of interviews with stakeholders from EHS Biosafety, research labs and sustainability experts were conducted and a synthesis was performed on what each segment cares about most:



"science is a race to achieve results; as a PI, I can't be bothered to tell my team to be conscious about sorting different types of materials"

"there is no or little tolerance for contamination in our experiments"

"in order to raise awareness across campus about, incentives must be aligned across all stakeholders"

"how can you even reduce the amount of waste, when no one is measuring how much waste is being produced"

"Stericycle won't accept bins that are too full, but it is also a waste of time and money for the team to pick up boxes that are only 15% full."

"it becomes a hazard when liquids in the bin" "sometimes, the EHS team isn't alerted for awhile, & boxes smell"

Auto-requ

Auto-request for EHS pickup of the bio-waste box

into an upgraded web platform for EHS. Key elements include:



Tracking mechanism to record waste produced per lab



Ultrasound sensor tracks how full the box is and activates an auto-request process



Humidity measures hazardous liquid levels



Load sensor warns technicians if bio-waste box is overweight



Gas sensor to measure odorous particles





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