

From Awareness to Action: Building an E-Waste Recycling Framework for Boston University

Introduction

Electronic waste has become one of the fastest growing waste streams in the world. The Global E-waste Monitor 2024 estimates that humanity generated about 62 million metric tons of e-waste in 2022, an increase of more than 80 percent since 2010, while only about one fifth was formally collected and recycled (Global E-waste Monitor 2024). Much of the remainder is dumped, exported, or processed in informal sectors, where workers dismantle devices without protection and toxic metals like lead and mercury enter soil, air, and water. In the United States, even where recycling options exist, participation rates are still relatively low and data on what actually happens to collected devices are incomplete (Meidl 2023).

College campuses are a critical setting for addressing this problem. Students are heavy electronics users, replace devices frequently, and are often willing to engage in sustainable behavior when systems make it easy. Universities also serve as central collection points and can model policies that might scale to cities or states. At Boston University, BU Sustainability and BU Information Security already collaborate on Shred + Recycle events and provide guidance on how to recycle electronics on campus. Still, many students either do not know where to bring old devices, or are not sure they can trust what happens next.

This project examines how behavior, communication, and policy design shape student participation in e-waste recycling, using BU as a focal case. It combines three components:

1. A short survey of university students (primarily BU, but also students at other universities) about awareness, confidence, and behavior.
2. A draft one-page “E-Waste Recycling Toolkit” aimed at reducing confusion and making it easy to act.
3. A policy comparison of Massachusetts, California, and New York to understand how different models of funding and responsibility might support campus programs.

Together, these pieces build a framework for how BU could move from general awareness toward practical, trusted systems that help students turn intentions into action.

Background

E-waste contains both valuable materials and hazardous substances. Precious metals like gold, silver, and palladium can be recovered, but so can toxic components, including lead, cadmium, and brominated flame retardants. When devices are dumped or burned, these

materials contaminate air and water and create serious health risks for workers and nearby communities (Global E-waste Monitor 2024). Many high-income countries export a significant share of their e-waste to lower-income countries, which raises additional justice concerns when waste is processed in unsafe conditions (Meidl 2023).

In the United States, there is no single federal e-waste law. Instead, states have developed a patchwork of policies. One common tool is Extended Producer Responsibility (EPR), which requires manufacturers to help finance or manage recycling programs. New York's Electronic Equipment Recycling and Reuse Act, for example, requires manufacturers to provide free and convenient recycling for covered electronics, often through collection events, mail-back programs, or retail partners (NYSDEC). California chose a different model. The state's Electronic Waste Recycling Act of 2003 created a consumer-paid recycling fee at the point of purchase. That fee funds a statewide system of collection and processing for covered devices, such as televisions and computer monitors (CalRecycle; California Department of Tax and Fee Administration). Massachusetts, by contrast, has banned cathode ray tubes (CRTs) from disposal in landfills and incinerators, but still does not have a comprehensive statewide e-waste program. Residents rely on a mix of municipal drop-off sites, private recyclers, and voluntary programs (ERIDirect; Recycle Electronics, MassDEP).

Behavioral research shows that information alone rarely solves the problem. A national survey conducted for the Electronics Recycling Coordination Clearinghouse (ERCC) found that fewer than half of respondents were certain they knew where to recycle electronics in their state, and that convenience was a major barrier even where programs existed (ERCC Consumer Awareness Survey). Campus-level studies echo this pattern. Surveys at large U.S. universities have found strong environmental concern but low use of e-waste collection systems, with participation rising when bins are visible in high-traffic areas and when students receive clear instructions or feedback about what happens to their devices (Arain et al. 2020; Anderson 2025).

At Boston University, BU Sustainability's "Recycle" page outlines how to handle large electronics, small devices, and cell phones, including specific contacts and locations for pickups and drop-offs. BU Information Security and BU Sustainability also partner on semesterly Shred + Recycle events, which accept electronics, cords, batteries, lightbulbs, textiles, and more, and are open to students, staff, and faculty (BU Sustainability; BU Information Security). These efforts show that BU already has some infrastructure. The question this project asks is whether students know about these options, trust them, and find them convenient enough to use.

Methods

This project used a short online survey to understand how university students think about e-waste recycling and what might motivate them to participate more. The survey was open from October 20 to October 25, 2025, and received 212 responses.

Although the project focuses on Boston University, the sample was not limited to BU students. Most respondents were BU undergraduates or graduate students, but some were students at other universities in the United States. This mixed sample reflects how the survey

was distributed in practice. I shared the form through BU Sustainability-related mailing lists, student government and club group chats, and class group chats. I also asked friends, classmates, and e-board members of student organizations to fill it out and pass it along. Because the survey was intentionally short (under two minutes), I often asked people to complete it in real time. During student government meetings, social events, or study sessions, I would ask people to take out their phone and fill out the form while I was there. If I went out to dinner with friends or met someone new and the topic of sustainability or electronics came up, I asked if they were willing to answer a few questions. This direct, in-person prompting helped achieve a relatively high response rate.

The survey consisted of five multiple-choice questions and one open-ended question:

1. Whether respondents knew where to recycle or properly dispose of electronics on or near campus.
2. How confident they were that electronics collected for recycling were handled responsibly.
3. Which collection option would make them most likely to recycle (permanent bins, one-day events, mail-back programs, or retail drop-off).
4. Which motivators would encourage them to recycle more often (convenience, clearer information, proof of recycling, or rewards).
5. Whether they would support a small fee on electronics to help fund recycling programs.
6. The biggest reason they had not recycled electronics in the past (open response).

Multiple-choice responses were summarized using simple descriptive statistics. Open-ended responses were coded into four categories: lack of information (for example, not knowing where to go), convenience, distrust or skepticism, and “other” (including responses that did not fit the main themes).

The project also included a policy scan of state-level approaches in Massachusetts, California, and New York, using state agency reports, guidance documents, and secondary analyses. These sources were used to identify how each system funds e-waste recycling and how responsibility is allocated among consumers, manufacturers, and municipalities.

Finally, I planned to complement the survey with institutional context from BU Sustainability by asking three questions: (1) what happens to e-waste collected at BU events and drop-off sites, (2) whether BU’s downstream recyclers hold certifications such as R2 or e-Stewards, and (3) whether BU tracks the volume of e-waste handled each year. I contacted BU Sustainability by email using the address on their website but did not receive a reply by the time this paper was completed. That gap is acknowledged as a limitation, since it prevents a full account of how backend processing at BU aligns with student trust concerns.

Results

Awareness and knowledge

The survey results show that most respondents are familiar with the idea of e-waste recycling, but many do not know how to act on that awareness. When asked if they knew where to recycle or properly dispose of electronics on or near campus, 61.8 percent said they had heard of recycling programs but did not know where to go. Only 23.1 percent said they knew specific locations. The remaining 15.1 percent said they were not aware of any options at all.

This pattern suggests that the main barrier is not complete ignorance of the issue. Instead, many students are stuck in an in-between state where they know recycling exists in theory, but they do not have clear, actionable information about where to bring devices or which programs they can trust.

Confidence and trust

Confidence in recycling outcomes was relatively low. Only 14.2 percent of respondents described themselves as “very confident” that collected electronics are recycled or handled responsibly. Another 40.6 percent were “somewhat confident,” 30.2 percent were unsure, and 15.1 percent were not confident. In open-ended responses, many students described a familiar hesitation: they were worried that e-waste might be shipped overseas or landfilled after collection. Comments such as “I would recycle if I knew it actually gets recycled” and “I just assume it ends up in a landfill” appeared repeatedly.

These results align with broader findings from ERCC’s consumer awareness surveys, which show that uncertainty about what happens after drop-off is a major barrier, and that simply providing a program is not enough to guarantee participation (ERCC Consumer Awareness Survey).

Preferred collection options

When asked which collection option would make them most likely to recycle electronics, 56.6 percent of respondents chose permanent bins in dorms or student centers. One-day campus collection events were the second choice at 22.2 percent. Local retail drop-off options such as Best Buy or Staples were preferred by 14.2 percent, while mail-back programs were the least popular at 6.1 percent.

The strong preference for permanent, on-campus bins supports the idea that visibility and proximity matter more than novelty. One-day Shred + Recycle events at BU already accept electronics but occur in limited locations and time windows. They are helpful for people who already plan around them, but less effective for students who tend to act when a device breaks or is replaced in the middle of the semester.

Motivators and incentives

The survey also asked which factors would encourage students to recycle more often, allowing respondents to select up to two. Convenient drop-off locations were chosen by 60.8 percent of respondents, making convenience the dominant motivator. Proof or confirmation that

a device was recycled was selected by 47.2 percent, and clearer information about what happens to e-waste was chosen by 34.0 percent. Only 17.9 percent selected raffles, rewards, or dorm competitions. This suggests that most students are not waiting for prizes. They want low-effort systems and basic transparency.

Policy preferences

When asked whether they would support a small fee on electronics (for example, 1 to 3 dollars) to fund responsible recycling in Massachusetts, 38.2 percent said “yes, definitely,” 32.5 percent said “maybe, depending on how it is used,” 21.2 percent said they would prefer manufacturers to pay instead, and 8.0 percent were not sure.

These responses indicate that many students are open to a model similar to California’s consumer fee, especially if revenue is clearly tied to recycling infrastructure. At the same time, a substantial share of respondents support the principle behind New York’s model, where manufacturers bear more responsibility through EPR requirements.

Barriers to recycling

The open-ended question about the biggest reason for not recycling electronics confirms the themes already visible in the multiple-choice results. After coding, 44.8 percent of responses were classified as “not knowing where to go.” Another 31.1 percent described the process as inconvenient or time consuming. About 18.9 percent focused on distrust, such as worries about data security or skepticism about whether devices are really recycled. The remaining 5.2 percent included responses like “I just forget” or “I give things to family instead.”

Overall, the survey suggests that students care about e-waste, but their behavior is constrained by three intertwined barriers: unclear information, low confidence, and lack of convenient, visible drop-off points.

Mini Toolkit: From Awareness to Action

To translate these findings into a practical intervention, I drafted a one-page “E-Waste Recycling Toolkit” aimed at BU students. The toolkit is designed as a simple, visual guide that answers three questions:

1. What can I recycle?
2. Where do I bring it?
3. Why does it matter?

The design uses clear icons, large headings, and minimal text, modeled loosely on successful municipal guides such as simple recycling posters and campus-level zero waste guides. The goal is to reduce the cognitive load on students. Instead of clicking through multiple pages or reading long explanations, they can scan the toolkit and immediately see what they should do with an old phone or charger.

Because I was not able to confirm BU’s specific downstream partners or certifications, the current toolkit avoids making promises about third-party processors. Instead, it focuses on

clear instructions and directs students back to official BU Sustainability resources. Once BU confirms its partnerships and practices, the “where it goes” section can be updated to include more detail, such as whether recyclers are R2 or e-Stewards certified, and high-level information on how devices are dismantled.

Policy Brief

The final component of the project is a brief comparison of how three states - Massachusetts, California, and New York - structure e-waste policy and what lessons that offers for BU.

Massachusetts

Massachusetts does not have a comprehensive statewide e-waste program, but it has banned CRT televisions and computer monitors, along with certain mercury-containing products, from disposal in landfills and incinerators (MassDEP; ERIDirect). The state relies on municipal collection days, regional drop-off facilities, and private recyclers. Recently, Massachusetts created an Extended Producer Responsibility Commission to explore potential EPR laws for electronics, packaging, and other products (Massachusetts EPR Commission). At the time of this project, however, there is still no statewide requirement for manufacturers to fund or operate electronics recycling programs. For institutions like BU, this means e-waste management depends on internal policies, contracts with recyclers, and voluntary programs such as Shred + Recycle events and departmental pickups.

California

California's Electronic Waste Recycling Act of 2003 created the country's first major e-waste recycling fee. Consumers pay a small fee at the point of sale for certain covered electronic devices, and that fee supports a statewide system of collection and recycling (CalRecycle; California Department of Tax and Fee Administration). This model provides a dedicated funding source that can be used to reimburse collectors and recyclers. As a result, California has a relatively dense network of drop-off sites and events. For campuses, the main lesson is that stable funding can make it easier to maintain convenient collection options. If Massachusetts adopted a similar fee in the future, universities could potentially partner with state-approved recyclers or receive support for campus collection.

New York

New York's Electronic Equipment Recycling and Reuse Act follows a producer responsibility model. Manufacturers of covered equipment must provide free and convenient options for consumers to recycle their products, track the weight of collected items, and report outcomes to the state (NYSDEC; Ontario County). Many manufacturers fulfill these obligations through mail-back programs, retail partnerships, or collection events. For universities, this model can reduce institutional costs if manufacturers or their partners provide services directly. It also places more responsibility on companies that design and profit from electronics, not just on municipalities or campuses.

Implications for BU

The survey results and policy scan point toward a hybrid approach that could work well in Massachusetts. A small recycling fee at point of sale, similar to California, could provide stable funding for collection and processing. At the same time, an EPR requirement similar to New York's could require manufacturers to ensure convenient access and transparent reporting.

Within this emerging policy landscape, universities like BU could serve as pilot sites. BU already has a central sustainability office, existing guidance on electronics recycling, and recurring Shred + Recycle events. With clearer communication and modest policy support, BU could demonstrate how campus-based infrastructure can help state agencies meet collection and reporting goals.

Discussion

The survey findings fit closely with what existing research suggests about e-waste behavior. Awareness is necessary but not sufficient. Students in this project care about the issue, but they often do not know where to go, do not fully trust that recycling works, and do not encounter convenient collection options in their daily routines.

On the one hand, BU already has more infrastructure than many students realize. The BU Sustainability "Recycle" page provides detailed guidance on large and small electronics, and the Shred + Recycle events, run in partnership with BU Information Security, accept a wide range of electronic items and related materials several times a year (BU Sustainability; BU Information Security). On the other hand, this infrastructure is not yet fully integrated into student life. The events tend to run during daytime hours in specific locations, and the main recycling guidance is buried several clicks deep on the website. A student scrolling through their phone after a laptop dies in their dorm is unlikely to find and read that information without a clear nudge.

A review of BU's Shred + Recycle events also shows a gap between existing infrastructure and the way students dispose of electronics. IS&T notes that these events process significant volumes of material each semester, but their structure primarily serves departments and staff. Students, however, generate most of the small electronics on campus, especially during move-out when items like chargers, earbuds, keyboards, and miscellaneous cords are often discarded. BU already provides Goodwill carts for clothing and dorm items during move-in and move-out, but there is no parallel option for electronics. The survey results suggest that students are more likely to participate when recycling is available at the times and locations where they are already sorting their belongings. Placing small secure electronics bins in dorm lobbies during move-out, or adding an electronics drop-off next to the Goodwill carts, would align collection with actual student behavior. Student-focused Shred + Recycle pop-ups in dorms or the GSU during high-turnover periods could further increase accessibility. These adjustments directly respond to the barriers identified in the survey by improving convenience and making drop-off options more visible.

The E-Waste Toolkit is one attempt to provide that nudge. By condensing the most important information into a single and visual page that points back to official resources, it reduces friction at the moment of decision. In combination with better physical placement of bins in dorms and student centers, it could help turn vague awareness into actual drop-offs.

Trust remains a harder challenge, especially without access to detailed information about BU's contracted recyclers. Many students are aware of news stories about exported e-waste and recycling facilities that do little more than ship containers overseas. In that context, simply saying that items are recycled responsibly is unlikely to change minds. A more convincing approach would be for BU Sustainability to publish basic details about downstream partners, certifications, and quantities processed each year. Even high-level metrics, such as the total pounds of electronics collected at Shred + Recycle events or the share of devices handled by certified recyclers, could support the kind of confirmation students say they want.

The main limitation of this project is that it relies almost entirely on self-reported survey data and publicly available policy documents. I was not able to supplement these findings with internal data from BU Sustainability or procurement contracts that might show exactly where BU's e-waste goes. The survey sample also includes students from other universities, which means the results describe university student attitudes generally rather than BU students only. However, the patterns match both national surveys and campus-level studies at other institutions. That consistency suggests the findings are still useful for designing behavior-focused communication tools, even if they cannot be treated as a precise measurement of BU student behavior.

Conclusion

This project set out to understand how Boston University could strengthen e-waste recycling by focusing on behavior, communication, and policy. The survey of 212 university students showed that concern about e-waste is high, but participation is limited by three main barriers: lack of clear, actionable information about where to go, low trust in what happens after drop-off, and inconvenient or invisible collection options.

In response, the project developed a draft E-Waste Recycling Toolkit that translates BU's existing recycling guidance into a student-friendly format. The policy comparison of Massachusetts, California, and New York suggests that a hybrid approach that blends stable funding with manufacturer accountability could help universities like BU expand their role as collection hubs.

Because I was not able to obtain direct information from BU Sustainability about downstream recyclers or volumes collected, the project stops short of a full institutional audit. That limitation also highlights a key opportunity. If BU were to publish even basic data on e-waste flows and partner certifications, that transparency could directly address student skepticism and support the behavior changes identified in the survey.

Ultimately, the project argues that e-waste management on campus is not just a technical or logistical problem. It is also a communication and trust problem. When students

know exactly what to do with an old phone, can access a drop-off point in the spaces where they already live and study, and believe that their effort makes a real difference, recycling is more likely to become a normal part of campus life instead of an occasional special event.

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Appendix I: Survey

Q1. Awareness of where to recycle

- Heard of programs, don't know where to go: 131 (61.8%)
- Know specific locations: 49 (23.1%)
- Unaware of any options: 32 (15.1%)

Q2. Confidence that collected electronics are handled responsibly

- Very confident: 30 (14.2%)
- Somewhat confident: 86 (40.6%)
- Unsure: 64 (30.2%)
- Not confident: 32 (15.1%)

Q3. Preferred collection option (single choice)

- Permanent bins in dorms/student centers: 120 (56.6%)
- One-day campus collection events: 47 (22.2%)
- Local retail drop-off (Best Buy/Staples): 30 (14.2%)
- Mail-back programs: 13 (6.1%)
- Other: 2 (0.9%)

Q4. What would encourage you to recycle more? (select up to two)

(Percent is the share of respondents selecting each item; totals exceed 100% because this is multi-select.)

- Convenient drop-off locations: 129 (60.8%)
- Proof/confirmation that my device was recycled: 100 (47.2%)
- Clearer information about what happens to the waste: 72 (34.0%)
- Raffles/rewards/dorm competitions: 38 (17.9%)

Q5. Support for a small recycling fee on electronics

- Yes, definitely: 81 (38.2%)
- Maybe, depending on how it's used: 69 (32.5%)
- No, manufacturers should pay instead: 45 (21.2%)
- Not sure: 17 (8.0%)

Q6. Biggest reason for not recycling (open-ended, coded)

- Not knowing where to go: 95 (44.8%)
- Assuming it's inconvenient: 66 (31.1%)
- Don't trust that recycling actually happens: 40 (18.9%)
- Other: 11 (5.2%)

Appendix II: Toolkit

E-WASTE RECYCLING GUIDE

BU STUDENT TOOLKIT



WHAT YOU CAN RECYCLE:

PHONES, LAPTOPS, TABLETS,
CHARGERS, EARBUDS, KEYBOARDS,
USBS, ADAPTERS, AND OTHER SMALL
ELECTRONICS.



WHERE TO BRING IT

- IT HELP CENTER (179 AMORY ST)
- RECYCLING OFFICE (ASHFORD ST)
- SHRED + RECYCLE EVENTS EACH SEMESTER



WHY IT MATTERS

ELECTRONICS CONTAIN VALUABLE
MATERIALS AND TOXIC METALS.
RECYCLING KEEPS HEAVY METALS OUT
OF LANDFILLS AND REDUCES MINING.