1 Sustainable Joe

Back2Earth
Collective Composting Program

Pilot Report

Exploration of a Collective Food Waste Solution

November, 2024

Background

"Since the industrial revolution, human activities have increasingly destroyed and degraded forests, grasslands, wetlands and other important ecosystems, threatening human well-being. Seventy Five percent of the Earth's ice-free land surface has already been significantly altered, most of the oceans are polluted, and more than 85% of the area of wetlands has been lost. This destruction of ecosystems has led to 1 million species (500,000 animals and plants and 500,000 insects) being threatened with extinction over the coming decades to centuries, although many of these extinctions are preventable if we conserve and restore nature."

- Sir Robert Watson,
Tyndall Centre for Climate Change Research
WWF 2020 Living Planet Report[1]

Human activities have been driving biodiversity collapse and climate change at an accelerating pace for decades and the need for transformative change is dire. While the scope and scale of the solutions can seem incomprehensible, there are numerous accessible changes that we can make immediately to reduce our impact. Perhaps the most fundamental of these is our food. As of 2020, 38% of the global land surface is used by humans for agriculture[2], roughly 30 - 40% of all food produced for human consumption is wasted[3], and food is the single largest source of municipal waste in the US making up 24% of the national stream[4].

In 2017 the Waste Reduction District of Monroe County commissioned a study by Kessler Consulting that showed that up to 39% of the waste stream generated in Monroe County is compostable. In 2023 The District and the City of Bloomington jointly proposed funding for a composting pilot program at multi-dwelling residential complexes to reduce the amount of organic material in the local waste stream, determine the effectiveness of such a program in achieving this goal, and consider the feasibility of implementing such a program across a broad spectrum of multi-dwelling complexes. The grant was awarded to 1 Sustainable Joe, who established the Back2Earth program which provides training and shared composting equipment to residents who are then able to manage their own food waste on-site. This is the report of that initiative after just over 1 year of operation.

1. WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland www.worldwildlife.org/publications/living-planet-report-2020
2. "Land use in agriculture by the numbers" Food and Agriculture Organization of the United Nations, 07 May 2020 www.fao.org/sustainability/news/detail/en/c/1274219/
3. "Food Waste" World Wildlife Fund, https://www.worldwildlife.org/initiatives/food-waste
4."EPA National Overview: Facts and Figures on Materials, Wastes and Recycling" EPA, 22 November 2023 www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#Landfilling

Table of Contents

I. Program Design

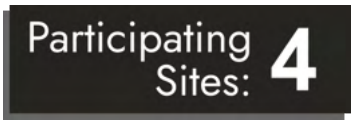
The premise of Back2Earth is to empower residents to manage their food waste by providing the equipment, training, and support for on-site composting. It leverages the number of participants to distribute the workload, making the effort light for each individual and the operation largely autonomous. To support the collective effort, participation is divided into 3 roles: base participants just add their material, turners mix the pile on a weekly rotation, and one site lead serves as the on-site expert and point of contact for the program.

To start any given site, the property management (or equivalent) must first have a suitable area on the grounds and formally agree to permit the process. Then, residents are informed via email about the opportunity to participate and can sign up online. When there are enough participants and the site lead and turner roles are filled (about 1 turner per 5 participants), the equipment is installed, training is provided, and the program begins. During the first year after launch, 1 Sustainable Joe provides monthly visits with site leads to inspect compost, phone and email support for any composting questions, and service to equipment as needed.

II. Effectiveness

There are 3 measures by which the performance of the Back2Earth program can be evaluated: the numbers of participants, the amount of organic material diverted, and the behavioral impacts. The data provided in this section are from Sept 1, 2023 - Oct 31, 2024.

A. Numbers of Participants



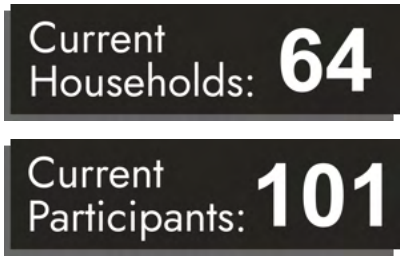
1. All 4 sites have been operating successfully since their launches on 9/18/23, 1/21/24, 4/18/24, and 4/27/24. They are a combination of two traditional apartment properties, a cohousing collective, and a co-operative housing property. (*The Woods at Latimer, The Covenanter Hill Neighborhood, Bloomington Cohousing, & Bloomington Cooperative Living - Middle Earth house*)

The search for properties began with survey data collected by the Bloomington Commission on Sustainability in 2020. In it, approximately 175 multi-family housing property managers were sent a survey about waste management policies. About 50 responses were received, and 13 indicated that on-site composting was either permitted, or undecided. All who responded 'permitted' belonged to one of two property management groups, and were contacted by 1 Sustainable Joe. Both groups expressed interest for several of their properties and decided to select one location to pilot the program before expanding. The 'undecided' survey respondents were also contacted, but none were reached.

The cohousing and co-op participation developed organically from word-of-mouth exchanges that reached members of each community. Both were already reflecting on improved food waste solutions, took interest in the program, and met the program criteria.

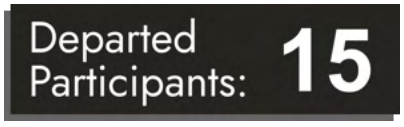
Additionally, 11 properties outside of the city of Bloomington were identified and contacted about participation in the program; 2 were interested if the other pilots succeeded, 2 were not, and 7 were unreachable.

Overall, additional sites could likely have been recruited for the pilot phase, but the existing set contained sufficient variability and activity to provide ample information for the pilot so further sites were not actively sought.



2. The program is designed for participants to operate as 'households'. Only 1 member of a household is required to sign up, complete the training, and provide contact information for program communication. When the sign-up is completed it asks how many members are in the household of age 8 or older, and this total is used to determine the total number of food waste generators that are contributing material to the program and potentially practicing the sorting of food waste at home.

Participation rates vary from site to site, but are generally high. The cohousing has a participation rate of 14/14 units (100%), The Woods has 19/72 (26%), and Covenanter Hill has 18/206 (9%). Participation at the Co-op is unlike the other sites: rather than functioning as separate households, residents prepare whole-house meals daily and the food waste is collected in a shared receptacle. Waste cannot be associated with individuals, but since composting is a house policy for shared meals it is assumed to be at 100% participation.



3. It is also worth noting that annual turnover occurs at 3 of the 4 sites, who all report having a significant number of academic residents. In 2024, The Woods had 6 household move-outs and 6 new sign-ups; Covenanter Hill only launched with residents renewing leases resulting in no move-outs and 10 fall sign-ups; and the Co-op had 6 move-outs and reported 2 new sign-ups. The Cohousing has had no move-outs to date.

Interestingly, all 4 pilot sites spontaneously filled and maintained the required roles with the specified ratios: each had exactly 1 participant sign up for site lead and 1 turner for every 4 or 5 participants. Also, 30% of all sign-ups had never composted before, including several who signed up as turners.

B. Material Diverted

1. The best measure of the impact of the program is the material it diverts from the landfill. Given the importance of this information, diversion tracking is integrated into the design of the program. Each site is equipped with a digital scale and a QR code, and each participant is provided a pail and a unique ID. They are instructed to weigh their pail before adding it to the pile, and use the QR code to submit their ID and weight through a page on the program's website. These entries then build a detailed history of waste generation through the life of the pilot, which is used for all of the graphics and assessments below.

It is important to note that weight entries can be easily forgotten or skipped. This is most evident with site #2. After reviewing the data for April and consulting with the site lead and turners in May, it was determined that nearly 40% of the month's additions had not been recorded. Despite reminders, similar gaps occur in June, July, & October. No compensation was made for missed entries so the data that follows is purely from recorded entries. For reference, a rough estimate puts total missing entries around 5-10% of recorded entries.

2. Here are the all-time program totals from September, 2023 - October 2024:

Waste Diverted: **4,427** lbs

Pails Emptied: **1,090**

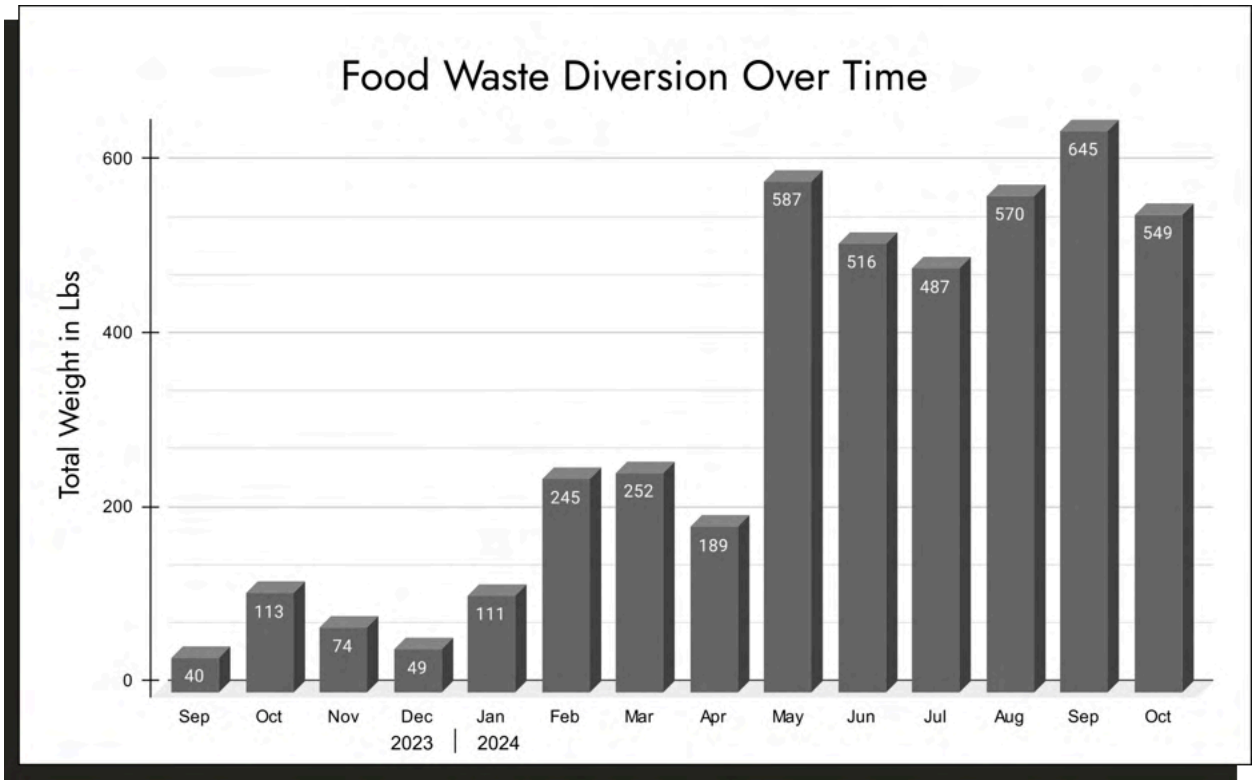


Figure 2.1

3. To illustrate the different trends at each location, weight data can be separated by site:

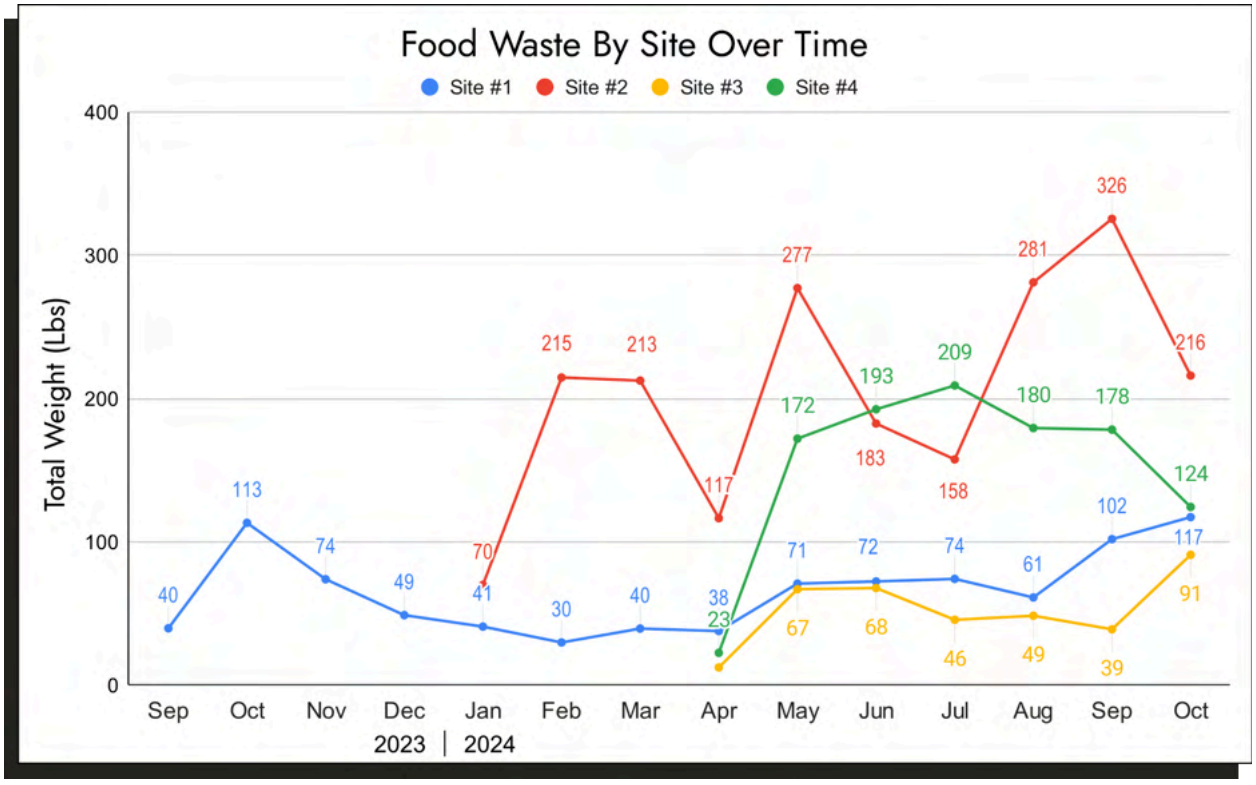


Figure 2.2

Diversion can also be compared by using monthly averages to show the relative differences by site as shown in figure 2.3 . Another metric of use is the relative frequency of weight entries, shown in figure 2.4. (Data averaged from May - Oct 2024)

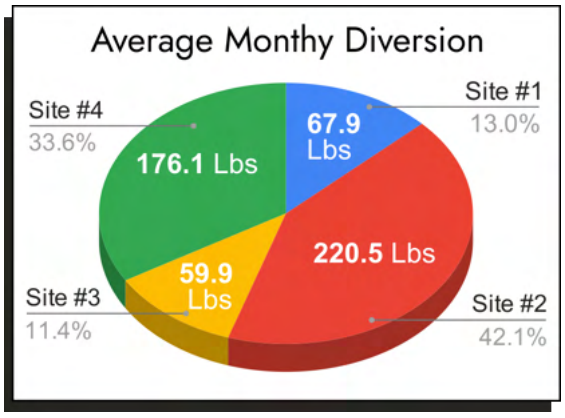


Figure 2.3

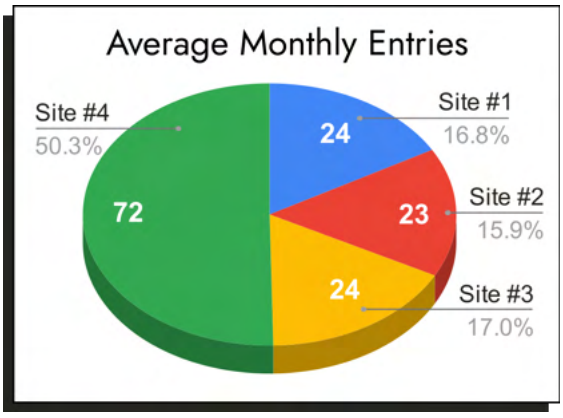


Figure 2.4

It is also possible to determine the number of households adding material in a given month and calculate the average weight per contributing household. Because data from site #2 has been inconsistent, it is excluded from this comparison.

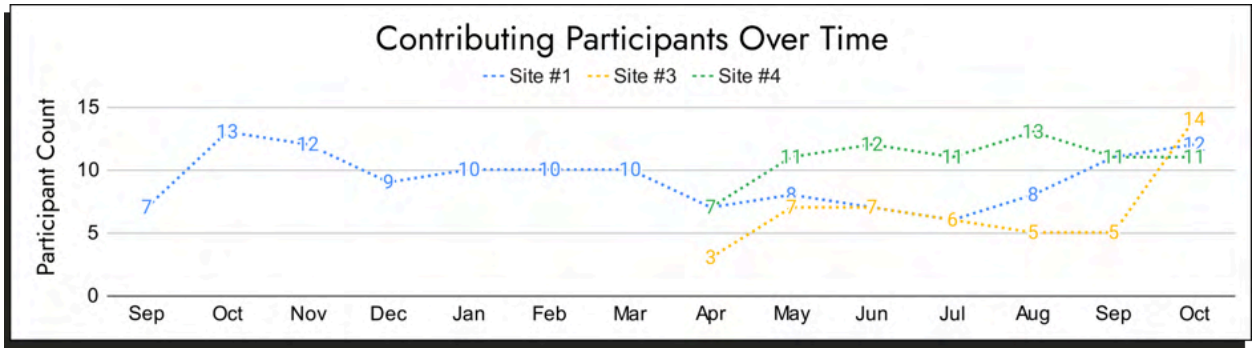


Figure 2.5

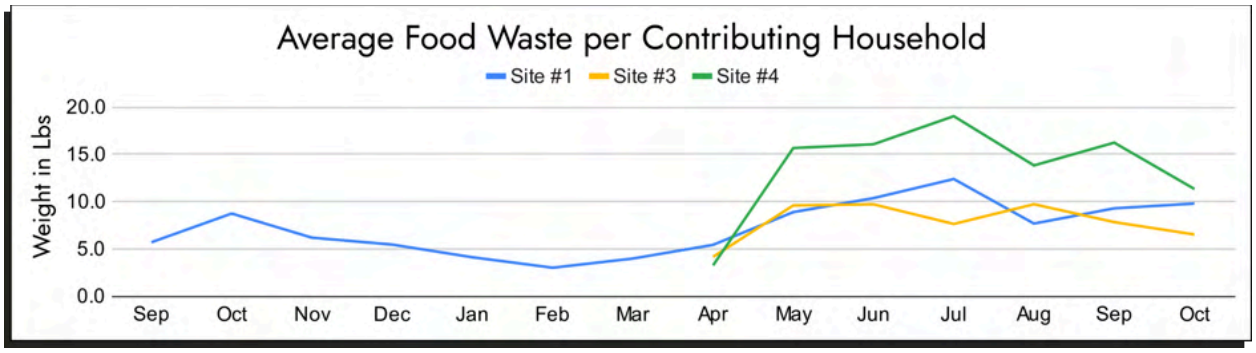


Figure 2.6

4. Finally, individual households can also be compared independently of their site. The first diagram shows the relative breakdown of food waste contributions from all households over all time. The second shows a set of monthly weight ranges and the number of households whose diversion falls in that range. This illustrates that around 18% of the households in the program contribute 6-8 lbs/mo., 17% contribute 0-2 lbs/mo., and the majority are below 10 lbs/mo. (Note that site #2 weights are averaged for Figure 2.7, and in omitted from Figure 2.8)

Figure 2.7

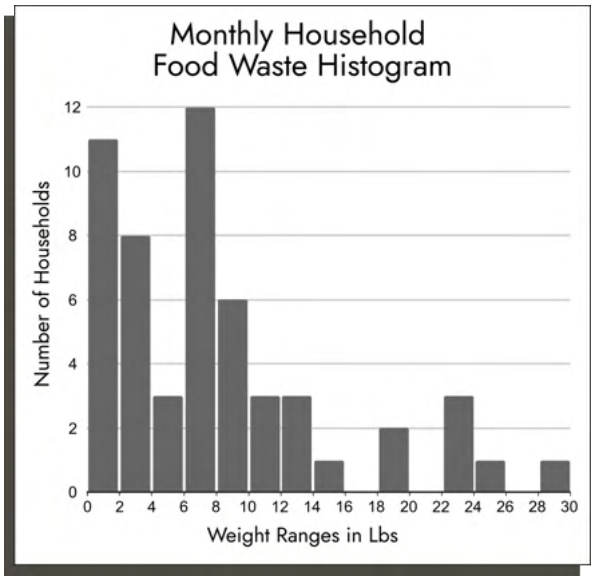


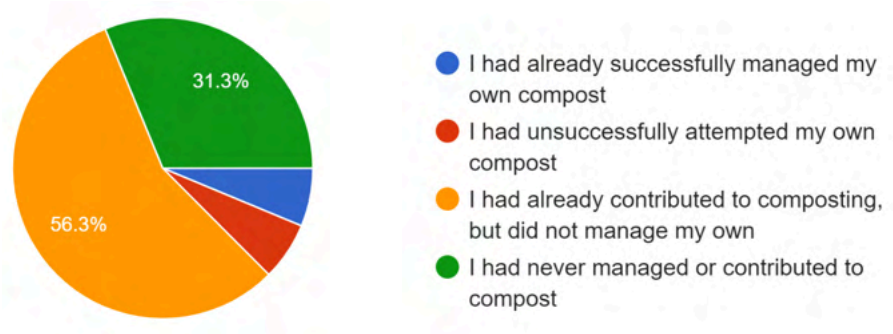
Figure 2.8

C. Behavioral Impacts

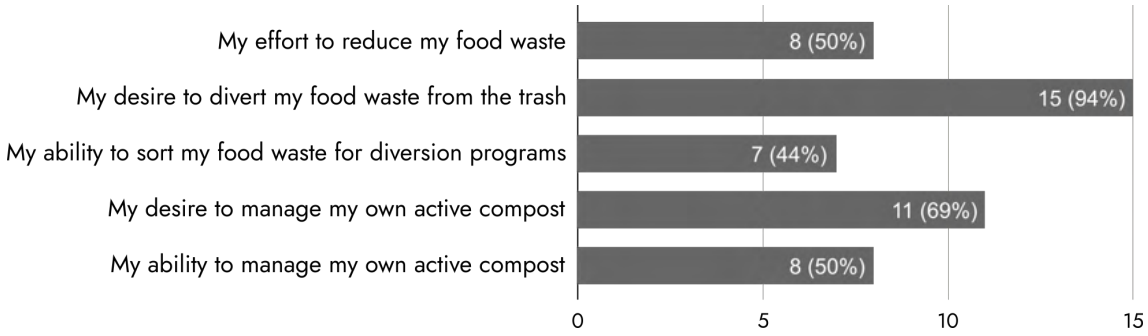
The final assessment is not from measuring waste diversion, but from engaging with participants.

1. A survey was distributed to all households participating in the program for at least 5 months. It was sent to 56 participants and received 16 responses. One section focused on the personal impact of the program by posing the following questions:

1. Which best describes your composting experience before participating?



2. Has participation in this program increased any of the following? (Check all that apply)
   [options are on the left, the results of checked responses are on the right]



While the questions are subjective and only about 30% responded, the results are generally positive. Almost all have an increased desire to divert food waste after participating, and half or more also have an increased desire to reduce their food waste, manage their own compost, and feel more able to manage it than before participating.

2. Additionally, observations and interactions while administering the program show that participants have been largely willing to follow through with their engagement. Monthly compost inspections have shown piles to be generally well balanced and having minimal contamination. Turners at site 1 were willing to meet for a mid-year troubleshooting session that resulted in visibly improved turning quality and pile health. Site 2 has consistently produced active piles that achieve 140-150°F and fully break down in around 3 months. While there are certainly some cases of participants not following through, the majority have been respectful, responsible, and successful in collectively managing their food waste.

III. Feasibility of Broad Spectrum Implementation

The pilot program has so far demonstrated that the given model can succeed in a variety of multi-dwelling environments, but is dependent on one important factor, and has two others that will become better defined in time.

A. The structure of the program has provided consistent results during the pilot and can be reliably repeated at additional multi-dwelling complexes. The program's informational literature was successful for presenting the concept to both new property managers, and the residents of properties interested in participating. The training and educational resources like the food waste sorting and prep guides provided residents with a clear and common understanding of the composting process, as well as the responsibilities for their respective roles. The success of a site ultimately depends on the engagement of the participants, but the startup process and support period have enabled each site to undertake the process of composting and become familiar with the fundamentals to make it succeed.

B. Though operationally successful, the startup of the program at a new site cannot be financially sustained without the support of grant funding. First, conversations with property managers indicated that while there is willingness to invest in compost services for its residents, the full program cost exceeds an acceptable waste budget. Second, the participant survey that was referenced in the Behavioral Impacts section (II.C.1.) also included a section to assess the financial value. The survey asked for a 'fair monthly cost', and 'highest acceptable monthly cost'. To illustrate the viability of participant funding: if all participants were willing to pay the average highest acceptable monthly cost, 1 year of participation would only cover around 25% of the startup cost and year of support (using the average participation rates during the pilot). While alternative methods for reducing program cost have been considered, simply none have the ability to bring the cost to a participant funded range without undermining the quality and sustainability standards of the program.

C. A significant factor that also impacts the overall cost is the longevity of the equipment. It is presently built using lumber treated only with natural oil, which means it is non-toxic and low impact but lacks the durability and lifespan of other materials. This is of particular importance because the equipment represents a substantial amount of the overall program costs. For reference, the following visual shows the relative breakdown of the cost of launching a new site:

Figure 3.1

While the existing equipment from the first site is still solid and in stable working order, it is still uncertain how long it will last before it wears enough to warrant full replacement. If a build lasts 5-7 years, its cost can be distributed over time and require less attention, but if it lasts 2-3 years, the amount of rebuilding will grow significantly with the growth of the program. An alternate bin design is currently in progress to address observed points of weakness, simplify construction, and improve durability, and is expected to be used for the next participating site.

D. Another factor that is not yet known, but less significant, is the amount of support required for a site after the partner period. Ideally, established sites will require minimal involvement so the operational cost will remain low and resources can be allocated to starting and new sites. It is already known that some ongoing administrative support will be required for the residential turnover described in section I.A.3. It is also likely that light ongoing support will be needed as equipment ages and necessitates minor repairs to operate. The existing sites show promise that piles will remain balanced and maintained in the absence of monthly visits and recommendations, but additional time will be required to confirm the outcome. In any case, continued support will certainly not inhibit the establishment of new sites and is not estimated to influence capacity for another year or two at the given growth rate.

IV. Final Remarks

In summary, this pilot has demonstrated that there is an interest and willingness among property managers and their residents to establish on-site collective composting for their communities. The model has functioned well in the locations where it has been established, and the participants succeeded in maintaining balanced compost that is odor and pest free. The primary challenge to the program is not its implementation, but its capitalization.

As the administrator of the program, I am grateful to the Waste Reduction District of Monroe County and the City of Bloomington for their partnership in this process and for their commitment to solutions for organic waste. I would also like to thank the staff at The Woods at Latimer and Covenanter Hill who were closely involved in the program startup and played valuable roles in the planning and outreach to their residents. And lastly, I would like to recognize the over 100 participants in Monroe County who have signed up to responsibly manage their food waste, including those who have been willing to turn the piles for their peers and serve as site leads for their property.

Joseph Wynia
Back2Earth Director
1 Sustainable Joe Founder, CEO