Campus Composting Manual

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US Composting Council®

PLAN Post-Landfill Action Network

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1 Introduction

Campus Composting Manual: Our Mission

The goal of this manual is to equip the reader, whether you are a student, staff, or faculty member, with the tools and confidence necessary to begin the process of creating or expanding a compost program on their campus.

This is not a step-by-step guide because there is no one-size-fits-all solution. Every compost program has to be tailored to the unique needs of the institution it serves.

You may well require additional information or training to finish building out a compost program. If that's the case, we strongly recommend you reach out to either PLAN or USCC - we will gladly help you ourselves or point you in the right direction.

About the Post-Landfill Action Network (PLAN)

The Post-Landfill Action Network is a non-profit organization dedicated to cultivating, educating, and inspiring the student-led Zero Waste movement. We work to inform students about the waste crisis and equip them with the necessary skills and resources to implement Zero Waste solutions in their campus communities. PLAN works with more than 250 campuses nationwide on Zero Waste projects ranging from reusable to-go box systems to move-out waste programs to compost initiatives. PLAN offers case studies, best-practice guides, one-on-one advising, and leadership development resources to students on each of its member campuses. To learn more about PLAN resources, visit www.postlandfill.org/

About the US Composting Council (USCC)

The US Composting Council, a national organization dedicated to the development, expansion, and promotion of the compost manufacturing industry, was established in 1990 to encourage, support, and perform compost-related research. USCC promotes best-management practices, establishes standards, educates professionals and the public about the benefits of composting and compost utilization, enhances compost product quality, and trains compost manufacturers and compost markets to USCC members include compost manufacturers, marketers, equipment manufacturers, product suppliers, academic institutions, public agencies, non-profit groups, and consulting/engineering firms. To learn more about USCC Campus Composting projects, visit www.compostingcouncil.org/ourcampuscomposts

Why are we collaborating?

Introducing composting to a campus, whether it's a simple food waste collection service or an in-vessel composting unit, is a complicated process. To see it all the way through, implementation will require in-depth knowledge of composting (which may require training), a knack for leadership, and the collaboration of many stakeholders, from students to administrators.

The partnership between PLAN and USCC was a natural fit. PLAN has experience training students to galvanize change on their campuses and navigate the complex (and often frustrating) bureaucracy of school administration. The USCC is the authority on composting systems big and small, and serves as the trade organization for the compost industry at large. Between the two of us, we are able to arm campuses with the confidence and information necessary to start or expand a compost program.

A Word to Other Institutions

Although the target audience for this guide is primarily college campuses, there is an immense opportunity for expansion - it has a great deal of relevance to other institutions. This resource has the potential to be useful to everything from detention centers and hospitals, to government buildings and corporate campuses.

- Sports and Recreation Buildings
- Amusement Parks and Entertainment Complexes
- Large Corporations
- Restaurants
- Shopping/Outlet Malls
- Rescue Missions and Homeless Shelters

The information in this guide is meant for organizations with facilities generating large enough quantities of green and food waste to justify hosting a compost facility or on-site compost pickup. This allows businesses and institutions to reduce their environmental footprint, their waste bill, and possibly generate revenue if product sales are in the mix. By having a productive resource from discarded food and natural byproducts, organizations can turn what would be trash into a useful resource.

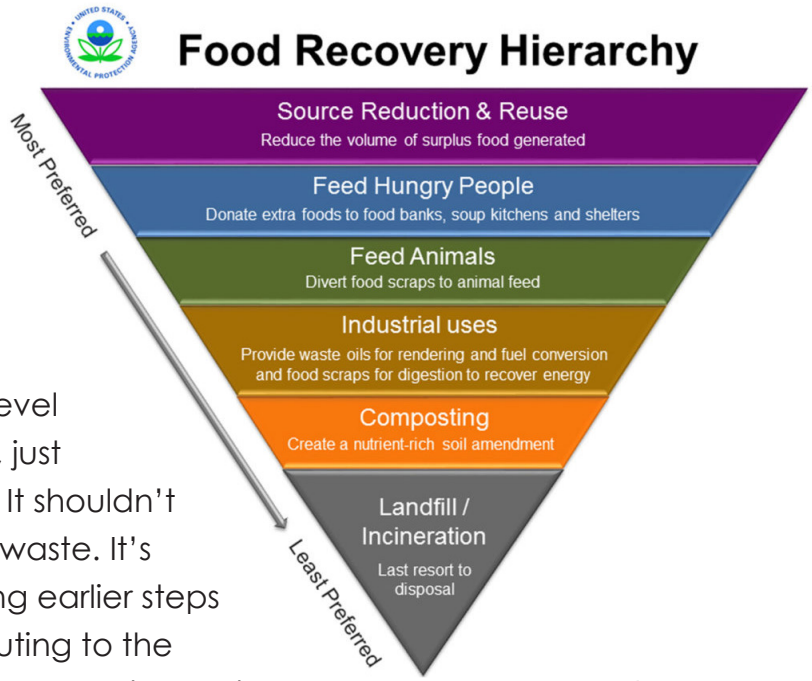
The Role of Compost in the Zero Waste Movement

Food recovery and compost are an important part of resource recovery, but they're not the whole solution. These zero waste policies are only effective at combating the waste crisis when combined with other strategies such as reduction of disposables, growth of the reuse economy, and expansion of recycling programs.

Before starting a compost program, it's important to understand compost's place in the grand scheme of zero waste.

The Food Recovery Hierarchy

The Food Recovery Hierarchy was created by the US Environmental Protection Agency (EPA) as a way to "prioritize actions organizations can take to prevent and divert wasted food."[1]



The Food Recovery Hierarchy[1]

Notice that compost is the fifth level of the Food Recovery Hierarchy, just above landfills and incineration. It shouldn't be the first step to address food waste. It's only appropriate after attempting earlier steps like source reduction and distributing to the hungry. After all, it wouldn't make sense to send unwanted-but-edible food straight to the compost bin without offering it to a food bank first.

Composting is the method of choice after every other food-waste reduction technique has been applied. Reducing resource use before the

food is wasted is the most efficient method - both in terms of energy conservation and value conservation. Additionally, studies have shown that composting is a "gateway" to a host of other environmental actions such as recycling, water, and energy conservation.[2]

It is, however, imperative that we try to keep food out of landfills whenever possible. At present, organic waste accounts for 22% of all waste in landfills in the US.[3] It's a common misconception that food will still decompose in a landfill, so throwing away food waste "isn't really that bad."Food in landfills doesn't decompose. At least, not in the way that it should.

Organic waste in landfills is quickly covered with more (often inorganic) waste. Without oxygen available for decomposition, organics are broken down anaerobically. This process doesn't return nutrients to the earth; it converts them into harmful greenhouse gases like methane. Even if soil were created, it would be trapped in a plastic-lined landfill with toxic material.

This is the waste we're trying to avoid. All food in landfills, even "difficult" foods like animal products, could have been processed in an appropriate composting facility.

Leadership and Stakeholders

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Program Leadership and Management

Fostering Student/Staff Collaboration

Starting any officially recognized campus organization involves collaboration of students and representatives or administrators from different campus departments. This is doubly true when it involves the use of facilities, or in the case of composting, possibly the creation of new ones.

Scheduling meetings with key stakeholders can be difficult because zero waste entails a diffuse set of challenges. An effective compost program will encompass food waste from the whole campus, but areas and buildings are usually divvied up and run by separate departments. Department reps may think that composting isn't their problem, and so the project may be transferred to another department or administrator.

If unchecked, this process tends to repeat itself indefinitely, culminating in what we refer to as "administrative run-arounds." Unless steps are taken to prevent run-around, it's possible that the project will be delayed by an unending series of forwarded emails. Here are some tips to avoid administrative run-arounds.

Find a Champion: For students embarking on a campus composting project, one of your first steps should be to find a champion. Having a project champion can ensure that you get into the right meetings with the right people to get the answers and permissions you need to get the ball rolling. This individual could be a faculty or staff member who is invested in the project's success, a professor that you have established exceptional rapport with, or a recent graduate who has been involved in projects on the campus in the past, and has experience navigating the administrative bureaucracy of your university.

Collaborative Meetings: Try to get as many stakeholders in one room as possible. This prevents miscommunications, delayed action, or confusion about individual responsibilities and the status of the project. This is perhaps the only time a big meeting is more efficient. Be sure to keep your champion and all other important project stakeholders up to date and in communication to keep the progress of your project running smoothly.

Be Determined/Find Compromise: It can be easy for campus administrators to dismiss student involvement or leadership. After all, it costs extra time and energy to say yes. Don't get discouraged if at first you are refused. Rework, try again, and remember that everyone - including administrators - wants students to thrive and succeed.

We advise staff and administrators to utilize the potential resource a motivated student represents. Understand their needs and concerns at the project's outset. Frame your project in a way that appeals to them as well.

The PLAN team is an excellent resource to support students that need help in identifying a project champion, getting the conversation started, or otherwise need a mentor.

Advice for Student Leaders

Project Development Advice

Taking on a project of this scale is a daunting task. Take a few deep breaths. It's doable. People have done it before, and you can do it too! If you'd like some extra guidance, PLAN can help: we offer webinars monthly on leadership and project development. For the moment, though, we've put together some tips to help you get started.

- **Gather a Team:** Don't try to take on the world by yourself. There are almost certainly like-minded students and staff on campus that are willing to collaborate with you towards a zero waste campus. Join an existing group or form your own to empower your efforts.
- **Play to Your Strengths:** When choosing how to contribute to zero waste, consider what it is you actually enjoy doing. Is it the process of starting an organization? Leading one? Solving logistical challenges, or getting the word out? Are you better at seeing the big picture or focusing in on the nitty-gritty? Spend some time in introspection figuring out your motivation and your modus operandi - it'll make you way more efficient later. Encourage other team members to do the same.
- **Set a Timeline:** In order to keep things moving you must set goals and deadlines, and detail the steps necessary to get there. Timelining should be a collaborative process - it's important for every member of the team to feel like the project belongs to them. It's also essential for the group to have a big-picture overview of important milestones and deadlines so they stay on track.

- **Set Realistic Goals:** You don't have to make grandiose goals to impact your community. Sometimes student groups get really fired up about an issue and decide to rally around complex problems. For students, keep in mind you have just 4 years or less in this particular organization, so create goals that are achievable within that time frame. If they're accomplished in a timely manner the organization can refocus its efforts on the next issue. The more specific a goal is, the more likely it is to be achieved.
- **Value Incremental Change:** The idea that a small difference can make significant impact later on is at the root of what we do. You never know how far your actions will spread. Even if, despite your best efforts, an initiative is not successful, that does not mean the very act of trying won't inspire others to act.

Leadership Turnover & Succession Planning

Whether you are a student or an administrator, it's an inconvenient reality that people move on. Students graduate. Staff transition to new positions. Turnover can exact a heavy toll on composting and recycling programs because they are a daily service that must go on without missing a beat.

If you are the staff leader of the campus composting program, you should be in a continuous process of nurturing relationships with cross-departmental staff and new student leaders. It can sometimes be difficult to "train up" staff from other departments who may not deal with student leaders or volunteers on a daily basis as compost programs do, so it's important to get them involved early. Invite staff from allied departments to help out as a volunteer occasionally, especially when they can interact on fun collection events with student leaders.

As a student leader or staff advisor, make sure to nurture up-and-coming talent by keeping an eye out for students who ask questions and are interested in the program. Consider applying for grants to fund work-study positions to attract and retain students. There are always students looking to fill leadership positions. Use that ambition to propel your organization.

Many groups implement an "apprenticeship" system, where leaders for the following year are chosen in advance. They shadow the students who currently hold the roles and learn first-hand the challenges and responsibilities.

Don't fail to give prospective leaders responsibility. It's not enough to lecture them on what you've done or the challenges they might face. Include them in meetings, decisions, and to give them control over portions of the project before you've moved on and left them to fend for themselves.

Staff members, we know it can be scary to entrust serious responsibility to students because you know they'll be gone in a year or two. The best ways to deal with this challenge are:

1. Set up mentorship systems where experienced students guide newer ones.
2. Encourage students to comprehensively document their efforts in a "Project Summary."

The Project Summary document is a useful tool for handing over leadership. This document should include:

- A summary of the leadership role
- Annual projects and events involved in the position
- Contact information for faculty, staff, community members, and other stakeholders that students will regularly be in touch with
- Any other important tasks involved in the leadership role

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Creating a Strategic Plan for Campus Composting

Mapping the Campus-Wide Flow of Compostable Materials and Gathering Your Stakeholders

It is common for campus composting to start as a fragmented process - often a pilot program is initially rolled out in a single location (such as campus dining halls). Unfortunately, in the long term, this can create obstacles to the establishment of a campus-wide system that tries to combine disjointed programs. It's especially difficult when each pilot program is managed by a different entity.

This approach can result in disagreements about where financial, labor, and logistical responsibilities lie. In order to avoid creating siloed-efforts and bureaucratic battles, it's important to take a step back and do some big-picture envisioning of what a campus-wide solution to organics management would look like.

The first step is to map out all of the things that need to happen to create a truly campus-wide composting system, using this graphic as a guide to gather all stakeholders together to create a task force.

Campus-Wide Flow of Compostable Materials

PROCUREMENT	USE	COLLECTION	DISPOSAL
Purchasing Department Catering Company Campus Dining or Contracted Provider (i.e. Sodexo, Aramark, etc.) Campus Vendors	Dining Establishments + Offices & Academic Buildings + Residence Halls + Events & Athletics	Standardized Bins & Signage ↓ Custodial/ Janitorial Team ↓ Transportation (i.e. trucks, carts, staff, etc.)	On-Campus Composting Site OR Externally-Contracted Hauler and Composting Facility

The following sections provide step-by-step guidance for creating a strategic plan.

1. Use the suggestions in Doing Your Research to ground your plan in historic context and in data collected from waste audits.
2. When choosing the appropriate compost infrastructure, remember that you are considering the needs of the campus as a whole, not just for a single location-specific project. After determining the equipment, space, and budget required for a campus-wide composting project, you should also consider what a scaled-down version of your project would look like. Your campus may only agree to an initial pilot program; more info available in Section IV.
3. Once you've got an idea of the specifics of the compost collection system, work with campus procurement to begin the switch to purchasing compostable products that your collection system can properly process; the section on Choosing Compostable Products outlines the most important factors to consider. Ideally, you should begin working with campus procurement before even implementing your collection system because these transitions can take time and may encounter unexpected challenges.

Doing Your Research

Understanding the Historical Context

Before you can implement a new composting program you need to understand the history of composting on your campus.

- Were there any previous attempts at starting a compost program? Who initiated it? What scope did it cover? How was it received, and what was the result?
- Are there pre-existing campus policies regarding organic or food waste? How might they impact your ability to compost?
- What are your state and city regulations regarding composting?
- Does your university already have a sustainability department? Do they have a zero waste program already? Who is involved, and what have they accomplished?

It's vital that you understand the historical context of zero waste and composting on your campus. That knowledge will help guard you against any unforeseen obstacles, as well as prove to stakeholders that you've done your due diligence.

On Past and Present Compost Attempts

When starting a new compost program, it may sense to begin with small scale pilots and then expand to areas of campus with the highest need (such as dining halls).

However, as previously discussed, campuses may run into challenges when different small-scale programs are run piecemeal and cannot be unified across campus. If your campus is in the position of already having some form of compost program that is insufficient - don't relent. Adapt the methods in this guide to tailor a proposal that improves your whole system. Don't settle for mediocrity.

Conducting a Waste Audit

Once you've done a little digging on the history of composting on campus, you'll be better equipped to tackle the present. Before you can even start to envision how a compost program should look on campus, you need to have the hard data on the state of food waste.

- How much food waste is generated in a given time period?
- What type of food wastes are there? What are the breakdowns between pre-consumer and post-consumer waste and between animal products and other food types?
- Is there an existing compost program? What facilities/buildings does it cover? Where are the compost receptacles positioned, and are they distinct from other types of waste?
- How effective are current composting practices? Are they used appropriately (i.e. waste being sorted correctly)? Are students and staff educated on proper composting practices?

It's important to know the amount and types of food waste so that you can choose the appropriate compost solution. Relatively small amounts of food waste with no animal products like grease or meat can be easily composted on campus in a small or three-bin system (we'll explain a bit more about what this means later in this manual). If there are animal products in the waste stream, or the volume exceeds your campus' capacity, you'll have to look into a a composting method that can reach the temperatures needed (see "Getting Technical") or a contractor.

Waste audits can be conducted in many ways; it's likely that you'll need to use several of them to get a comprehensive view of the situation on campus. Here are a couple popular and effective waste audit strategies:

- **Weigh the Waste events**. Have volunteers stationed at a dining hall sort post-consumer waste, both compostables and non-compostables, during a meal period. You'll raise awareness both during and after the event, especially when the data is shared publicly.

A weigh-the-waste event at a dining hall at San Francisco State University[4]

- **Back-of-House Tours**. Ask a dining staff manager for a behind-the-scenes look at food preparation areas. Bring a clipboard and make some visual estimations of pre-consumer food waste. Conduct some light interviews with the staff to get a better idea of how much food is wasted before the meal is served.

Waste audits are a vital first step in addressing compost policies on campus. The data you gather will be invaluable in convincing stakeholders to support a burgeoning compost program, so be as thorough as possible. Reference the PLAN Waste Audit Manual for more information on conducting a successful and thorough audit.

What advice do you have for other campuses starting compost programs?

Begin with a waste audit to gather data on your waste stream. Ensure you are in compliance with state compost permitting requirements. Have them at the table from the very beginning. Start small and focus on back-of-house and pre-consumer efforts to begin with and expand from there. Focus upstream on purchasing when you decide to move to post- consumer and try to source compostable options as much as possible to ensure sorting is easier. Get everything into place before you get started. Education, education, education. Celebrate your successes!

Jennifer Maxwell, Sustainability Program Manager, Office of Sustainability, Appalachian State University

Mapping Out Sources of Food Waste

An all-too-common mistake is to assume that food waste is only generated at dining halls.

Look around your campus. Are there compost bins in residence halls? Food cooked in a dorm, or brought back in a to-go container, will end up in the trash if there's no option for compost. What about in academic buildings and faculty offices - professors need to eat too!

Events that include food, and especially events that involve bringing guests from off-campus (like football games), can generate huge amounts of food waste. Events that are catered, either by campus dining services or a contractor, are guilty of the same.

	Potential Compostables	Stakeholders / Contacts
Dining Halls and Other Eateries	• Pre-consumer food waste • Post-consumer food waste • Compostable biowares • Wooden coffee stirrers	• Dining Services • Facilities Management • Cafe Managers
Residence Halls	• Post-consumer food waste • Paper towels • Tissues • Pizza boxes • Compostable take-out containers • Compostable coffee pods	• Resident Assistants (RAs) • Housing Office • Custodial/Janitorial Services
Public Spaces (Library, Student Centers, Gyms, etc.)	• Post-consumer food waste • Compostable biowares	• Custodial/Janitorial Services • Building Staff
Offices and Academic Buildings	• Post-consumer food waste • Paper towels • Tissues	• Department/Office Heads • Custodial/Janitorial Services
On-Campus Events	• Pre-consumer food waste • Post-consumer food waste • Compostable biowares	• Event organizers • Procurement Office • Vendors and tablers • Facilities Department • University Catering

Choosing the Appropriate Compost Infrastructure

There is no one-size-fits-all solution to compost infrastructure. Some campuses are well-suited for running a compost program on-site. Others will find their choice to be clear after they study space, zoning, and resources (both human and financial).

The best option will depend on a variety of factors:

- How big is your school? How many students and staff are contributing to food waste?
- How much free space do you have on campus? Where is it located? Is it accessible? How close is it to highly-trafficked areas? Are there existing plans for development?
- Are there potential compost facilities nearby that can handle your green and food waste?
- Does your campus have an existing farm or other agricultural facility?
- Is there time, money, and interest in actively managing the compost, or would it be better as a contracted or passive project?
- What are the state and local regulations regarding compost in your region?

And most importantly, of course:

- How much money do you have to spend on your program?

Take Stock of Your Organics Recycling Opportunities

As you consider beginning or expanding a program, first do a review of services in your region to see if someone local is already running a compost facility for organic materials. Local compost producers could be anyone from a city or county solid waste program, to a landscaper who collects and makes compost, to a local farm that accepts outside material for composting, to a full-fledged compost facility.

City/County Solid Waste Programs

This is a good place to start because even if your county/township/city is not running a compost program, they are involved in the zoning process for anyone who is. Simply ask for a list of anyone who is permitted by zoning to accept yard trimmings, green waste, and/or food scraps. Even if they are only listed as working with green waste or yard trim, be sure to contact any names they give you. Many yard trim composting facilities are in the process of adding food scraps to their permits.

You can find most municipal contact information online. Try to talk to someone in solid waste, recycling, or sustainability. If it's a very small operation, check the public works department. Occasionally the program may be run from the municipality's wastewater treatment program office.

Private Sector Compost Producers / Landscaping / Excavating Companies

A good place to look for compost facilities is at local landscapers and earth-moving companies. Often, they are interested or may already be composting materials they generate as part of their business. They may be open to a new source of nitrogen – and tipping fees – in the form of your campus's food waste.

If they are not already doing this, they may need special permits from your city, county, or state to begin accepting food scraps. At this point in the process, you've probably already spoken to a few of the relevant people. There may be the opportunity to create a win-win for you and the private sector company by working together.

School-Managed Infrastructure

For rural campuses or campuses with expansive agricultural facilities, in-house compost management can be a great option that is quite cost-effective in the long term. It has the added benefit of insulating your compost program from hikes in third-party prices and offering a revenue opportunity through selling finished compost. It is a much more technically-involved and labor-intensive process than working through a compost hauler, but it also offers great educational opportunities for students.

Appalachian State's specially-equipped trucks for hauling compost[5]

Pros	Cons
Learning/Research opportunity for students interested in sustainability and agriculture.	Can require heavy initial investment.
Can provide job opportunities for students.	May be more expensive to maintain over time than a comparable contractor-managed system.
Can provide compost for use on campus.	Will require maintenance even during off periods (Summer/Winter breaks).
Can provide a revenue opportunity through compost sales to community.	May require a lot of space.

School-managed compost can run the whole gamut from a small cold compost pile in a community garden to an in-vessel composter, a grinder, and acres of aerated windrows.

While it's a heavy initial investment, some compost programs do pay for themselves! Colorado State's windrows and in-vessel composter produce a surplus of compost that is sold in 2 cubic foot bags for $8, which pays for ongoing maintenance of their program (and we have enough left over to donate to community gardens!).

- Sheela Backen, Integrated Solid Waste Program Manager, Colorado State University

Contractor-Managed Infrastructure

Some schools, especially those with urban campuses, simply don't have the space necessary to implement even the smallest compost program. In these cases, there's still plenty of work to do on the collection side of things. You can still ensure that your food doesn't go to a landfill by working with an external hauler and/or compost facility to help your campus meet its compost and zero waste goals. Note that this option is limited depending on the availability of a local hauler and independent compost facility within easy transport distance of your campus.

Pros	Cons
Much cheaper than creating and maintaining your own compost-processing infrastructure (in the short term).	Limits student involvement and opportunity.
Stimulates the local economy. Opens the doors for potential public-private partnerships for your campus.	Contracting likely means more layers of bureaucracy - both going through more school departments and dealing with hauler logistics.
Provides networking and job opportunities for students.	Contract monitoring will need to take place continuously, and the campus is dependent on the facility's contamination requirements and permit compliance.

Denver University has a small campus in the middle of the city, so in addition to space concerns, they were worried about potential odors bothering their neighbors. They went the contractor route and love it: "They pick up regularly, they have been great partners, they communicate well, and all told the price is comparable or cheaper than what it would take for us to set up and manage a composting system here on campus."

- Emily Schosid, Sustainability Program Coordinator, Denver University

Common Collection Problems and Solutions

Problem: Difficulties in starting up pre-consumer food waste collection.
Solution: Staff training.
Since few people have grown up composting in their homes, it's not reasonable to expect Dining Services staff to know how to appropriately sort food waste right off the bat. They are, however, potentially some of your best allies in the struggle to sort organic waste. After all, most of the food on campus passes through their hands.

Create a small course on pre-consumer food waste that describes how food should be sorted (will you need to separate vegan materials from animal products?). Include examples and live demonstrations. Create a procedure that can be integrated into the back-of-house operations smoothly. This course will need to be integrated into the onboarding and training process for new employees.

Problem: Compost is too heavy and drives up our hauling costs.
Solution: Separate liquids.
One solution that immediately reduces the weight is collecting liquids in a separate stream. It also reduces labor needs and reduces the risk of bags of compost ripping apart. If you have some financial wiggle room, consider investing in a dehydrator to remove moisture from your food scraps before sending them to the hauler.

Problem: Improper sorting of waste streams leads to contamination.
Solution: Clear signage and student/staff education.
Until composting is a regular part of everyone's lives, students, staff, professors, and visitors will need to be instructed on how to sort their waste. It's doubly confusing since not all foods can be composted in every situation (you can't process animal products because your facility only uses cold composting, for example).

Clear and consistent signage can go a long way towards getting the right materials in the right places, but the reality is that you'll need to provide personalized education while rolling out the compost program. Have student volunteers positioned at waste stations during high-traffic periods (lunch/dinner) to help people sort their waste and explain why that grease-soaked napkin isn't actually compostable.

CASE STUDY

The University of Southern Maine estimates a conservative $2,000 in savings each year by separating liquids using an incredibly simple, inexpensive system that was integrated into their four-stream bin system. Used fryer oil jugs were repurposed into liquid collection containers with the addition of $2.25 funnels. An average of 29 gallons of liquid is collected each day, translating into 20 tons of avoided waste per year, since the liquids can be easily disposed of down the drain. Not only has this reduced their recycling contamination rates, but it has also reduced the need to double-bag loads of compost and recycling. [6]

The University of Southern Maine's liquid collection container[6]

Problem: Campus eateries provide mixed materials, leading to confusion and high risk of contamination.
Solution: Streamline purchasing.
Another way to avoid contamination is by streamlining your purchases. For example, establishing a campus-wide standard that all disposables must be certified compostable eliminates confusion as to which bin it should be thrown in.

Problem: Compost collection can be labor-intensive.
Solution: Streamline workflows and/or create a permanent position.
Introducing a new policy, like sorting pre-consumer food waste into the proper receptacle, will inevitably create more work for staff. This can be mitigated by smart planning (i.e. putting a full waste station in the kitchen instead of keeping the compost out back). Post-consumer compost will also create a third waste stream (beyond trash and compost), so make sure that you build a simple system for compost collection from dining halls, etc. Since compost is heavy and wet, this can sometimes include purchasing waste bins that are more ergonomic and/or sturdier than the standard bins.

Clear signage and student/staff education at Bates College[7]

Depending on the volume of compost on your campus, it may be necessary to create a new position to deal with the sorting, collection, and centralization of compost. Funds can be earmarked during the compost proposal, or a work-study position can be created. If the scope is smaller, a student volunteer may be suitable.

Problem: Compost smells unpleasant and attracts pests.
Solution: Use lidded bins, filters, and empty bins regularly.
At the site of collection, use lidded bins to keep pests out. Emptying your bins regularly will also reduce odor and subsequent pest problems. **Continue to Section VII. Getting Technical** for solutions to common odor issues at the composting site.

Choosing Compostable Products

Before swapping out everything that's disposable for a compostable substitute, it's important to take some time to educate yourself and your purchasing department about the compostability of food serviceware. Depending on the composting infrastructure that's being utilized, certain types of compostable products may not be appropriate.

Products that don't degrade in compost are costly to the compost industry - including your local composter or your own program. They add to processing costs because they must be sorted out and disposed before being integrated into the composting process. If they happen to make it into the compost, it is even more costly and tedious to screen them out.

Contaminants aren't always plastic, either. Some facilities can't process compostables, despite the name. Know the capabilities of your composter before purchasing compostable products.

Making the Case for Switching

It's no secret that compostable products are often more expensive than their plastic counterparts. You will need to convince stakeholders that it's a worthy investment economically or environmentally - or some combination of the two.

Chosen correctly, biodegradable products will increase the feedstocks that composters can accept, boosting your diversion rates. Consider replacing disposable straws and plastic dining ware with compostable alternatives at events. That allows the entire waste stream to be composted, rather than landfilled, which represents a double win of cost-savings and planet-savings.

Ensuring compliance across campus can be challenging, but developing a purchasing or procurement policy for all vendors, staff, faculty, and students is an important first step. Reach out to a PLAN campus coordinator if you're looking for guidance in developing policy language!

Confirming Compostability

Due to the confusion surrounding which products are compostable, and which among those require special equipment to process, manufacturers are devising ways to make it easier to identify compostable products. Some composters reject all serviceware due to the high cost of determining which is compostable and which is not. When investigating companies for bids and proposals, make clearly marked, BPI-certified products mandatory in your Requests for Proposals.

Certifications and Compostable Labelling

There are many international certifications for compostability. In the United States, the most reliable verification is the Biodegradable Products Institute icon. The BPI symbol helps consumers, composters, and waste haulers tell at a glance which products will biodegrade quickly, completely, and safely (when composted in appropriate municipal and commercial facilities).

BPI ®

COMPOSTABLE
IN INDUSTRIAL FACILITIES

Check locally, as these do not exist in many communities. **Not suitable for backyard composting.** CERT # SAMPLE

Source 8

The official BPI logo has a certification number unique to the product in the lower right hand corner of the label so you can verify the manufacturer of the product in the BPI database. In order to earn certification, products must be tested in approved, independent laboratories. BPI verifies the data to make sure the product meets ASTM (American Society for Testing and Materials) Specifications D6400 or D6868. Their tests mimic the operations of a well-run municipal or commercial composting facility.

Compostability is based on these criteria:

- It must biodegrade at a rate comparable to yard trimmings, food scraps, and other compostable materials, such as Kraft paper bags.
- It must disintegrate, so that no large plastic fragments remain to be screened out.

ASTM D6400 covers the requirements for plastic films and bags; **ASTM D6868** is for packaging that is designed to be composted, including plastic coated paper and board.

Compostable Product Glossary

PLA - The first type of compostable bioplastic, PLA still dominates today's compostable serviceware market. PLA stands for "poly-lactic acid" and means your plastic is made from corn instead of petroleum. If a product or packaging says #7 PLA compostable, it's a good choice.

PFA/PFOA - Per- and polyfluoroalkyl substances (PFAS), also known as fluorinated chemicals, are a group of synthetic chemicals that have been manufactured and used in a variety of industries around the globe since the 1940s. Common uses include stain repellent in fabrics and grease barriers in food packaging. Evidence has emerged that exposure to some PFAS can lead to adverse health effects. While the use of certain PFAS has been phased out, many are actively used and still end up in compost.

BPI has addressed this issue by restricting and hopefully eventually eliminating fluorinated chemicals from its certification. Specifically, BPI products must meet a European standard (EN 13432, limit of 100ppm total fluorine) by the end of 2019, and a statement of "no intentionally added fluorinated chemicals" shortly thereafter.

Compost Manufacturing Alliance

This group provides services to compostable product makers and has a list of items that have passed field disintegration tests within a variety of compost facilities and processes.

Either your campus (if you have your own facility) or your composter can work with CMA to use their field testing "acceptance" lists or develop on-site testing services that are funded by the makers of compostable products.

Composting Council Research and Education Foundation Field Testing of Compostable Products

This standardized field test will provide baseline data on composting conditions that impact disintegration of products and packaging, allowing CCREF to develop tools for composters wanting to understand best practices for processing these feedstocks. Participating facilities will be the first to have access to this data.

The best method for testing compostable packaging as a feedstock depends largely on your process. For almost all aerobic, small- to mid-scale operations, it's recommended to use the mesh bag method which mixes typical feedstock and test products and attempts to simulate your regular process. This assesses disintegration only; it's important to test ONLY certified compostable products to know that the ingredients are also safe for your compost. You can reach out to the Open Source Field Testing Program for information, resources, and a sample kit for running a mesh bag disintegration test in your facility at www.compostfoundation.org/fieldtesting.

Composting Isn't Just for Food

Don't stop at food serviceware when doing your research into potential compostables. A composting program can stretch into other areas of dorms, buildings, and commercial kitchens.

Paper Towels: It's estimated that $5.7 billion is spent on paper towels in the United States each year.[9] That translates into a huge quantity of paper products headed to landfills and incinerators if they are not captured by compost streams.

BPI certifies a number of paper towel brands for compostability, so be sure to investigate adding these to your composting program. Carleton College's compost program examined unbleached dormitory paper towels and found that with 50 shared bathrooms, having students move the waste from trash to composting diverted up to 12000 pounds of paper towels per year.

Coffee Pods: Single-serve coffee machines are a fast-growing trend on campuses and present a significant waste stream as many consume plastic, non-recyclable, or non-compostable pods.

According to a 2015 study, single-serve coffee has environmental benefits because it optimizes on-demand consumption and reduces the coffee, water, and energy wasted with typical drip-style coffee.[10] York University in Toronto also pointed out differences and advantages to some compostable pods over recyclable pods. While there are many compostable K-cups in development, the BPI database includes those that have met ASTM standards.

Convincing Your Campus to Compost

4

The next step is convincing your campus to compost by summarizing these pieces you've mapped out in Section III into a proposal, outlined in **Developing a Composting Proposal.** Start by providing arguments on the ways in which composting benefits the physical environment, climate change mitigation efforts, and the university's wallet using **The Basics: Why is Composting a Good Thing?**

Sketch out your **Financial Argument** and be prepared with specifications for **Pilot Programs** if your administration is unwilling to make significant investments off the bat and prefers to start with a scaled-down version of your composting system. Finally, take what you've learned from the pilot to expand the program to meet the needs of the entire campus.

Developing a Composting Proposal

The Basics: Why is Composting a Good Thing?

Zero Waste

Most folks who approach composting from the viewpoint of cost efficiency and solid waste management are seeking the ability to reduce their waste stream. Depending on your area and how you classify organic waste, anywhere from 20 - 40% of your waste stream can be comprised of organic waste. The higher end estimates are a result of counting biodegradable paper, green waste, biosolids, and food waste all as part of the organic waste stream.

Indeed, numerous states forbid the disposal of green waste (grass, leaves, tree and wood trimmings) in landfills. Some states, cities, and counties go even further by forbidding the landfilling of food waste generated at certain quantities

See more about who has landfill bans here: www.compostingcouncil.org/landfill-organics-bans

This practice not only reduces the cost of trucking these biodegradable materials to often far-away landfills and incinerators at a great cost, but preserves space at local landfills. It also directly reduces greenhouse gas emissions.

Plant and Soil Benefits

Compost enhances and restores the properties of soils and growing media physically (structurally), chemically (nutritionally), and biologically.

Compost as a soil supplement[5]

Improving Soils

Compost affects soil pH applied at quantities even as low as 10 - 20 tons per acre. It can help buffer and stabilize soil pH. Compost boosts the cation exchange capacity of soils, so they retain nutrients longer. It also increases the bioavailability of nutrients, which allows plants grown in the soil to more easily uptake nutrients with less leaching than chemically fertilized soil.

Pest and Disease Suppression

Plant disease is influenced by the quality and quantity of organic matter and microorganisms in soil. Research suggests that certain microorganisms may suppress specific plant pathogens such as pythium, fusarium, and nematodes.[11] Compost can be optimized to increase the population of beneficial microbes.

Better Soil Structure

Compost can greatly enhance the physical structure of soil. In fine-textured soils (such as clay or clay-loam), the addition of compost will reduce bulk density, improve friability (workability) and porosity, and increase its gas and water permeability (thus reducing erosion).

When used in sufficient quantities, the addition of compost has both an immediate and long-term positive impact on soil structure. It resists compaction in fine textured soils and increases water holding capacity and improves soil aggregation in coarse-textured (sandy) soils.

The soil-binding properties of compost are due to its high-humus content. Humus is a stable residue that results from a high degree of organic matter decomposition. The constituents of the humus act as a soil "glue" holding soil particles together, making them more resistant to erosion and improving the soil's ability to hold moisture.

Water Quality and Conservation

Adding compost to soil improves its capacity to store water. While obviously critical in times of drought, it's valuable even in regular conditions because it reduces the necessary frequency and intensity of irrigation. Adding compost to sandy soils also helps moisture to be more evenly distributed.

Climate Change

Organic discards contribute to climate change in a variety of ways. When the carbon they contain decomposes under anaerobic conditions, they release carbon as methane and other volatile organic compounds which contribute to global climate change. Materials such as grass clippings and leaves are also high in nitrogen and produce N2O when decomposing, which is 300 times more impactful than carbon dioxide.

Check out **compostingcouncil.org/ClimateChange** to learn more about the benefits of compost in carbon sequestration.

Social Benefits

An often overlooked aspect of campus sustainability initiatives is the potential for bringing revenue to the campus and increasing the institution's reputation as a whole. A 2019 survey conducted by the Princeton Review found that 23% of respondents said that a university's commitment to environmental "green" issues contributed strongly to their decision to apply or attend that school.[12] If you consider that 23% of a university's tuition-related income is due to its forward-facing sustainability commitment, it's clear that initiatives like campus-wide composting can be financially rewarding in other ways besides cutting landfilling costs. Increased application numbers can also boost a university's reputation, which comes with further social benefits.

The last point to consider is the significance of a campus's commitment to waste reduction. Unlike other aspects of sustainability in higher education, such as a university's investment in renewable energy or energy efficient operations, waste is the only tangible aspect that students interact with on a daily basis. A campus-wide compost program, which is so visible and forward-facing, demonstrates a school's commitment to sustainability more than any other initiative.

The Financial Argument

One of the greatest difficulties in starting a compost program is securing funding. Every department has a budget, and that budget is probably already wholly accounted for. You'll need to convince key stakeholders that your proposal is not only financially feasible - it needs to provide a clear economic benefit as well.

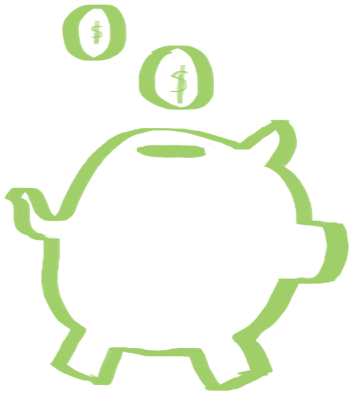
That's a tough job. While composting can certainly be cost-effective, it's not often that it's actually profitable. The best way to approach the financial argument is by using these two strategies during your presentation:

1. **Compare costs to existing analogous services.** The college is already paying someone to haul all their trash away every week. Compost haulers often cost the same or even less than trash haulers (or provide perks like free compost yearly), so it's an easy switch and an easy win. If part of the proposal is to use on-campus composting, play up the angle of producing your own compost for a cheaper, all-natural alternative to the chemical fertilizers currently being used by the Grounds Department.

2. **Chunk the proposal into bite-sized investments.** Instead of asking for $4M to implement your whole plan, present the pieces individually ($60k for a hauling truck, $120k for an in-vessel composter, $100k yearly for staff salary, etc.). Not only does it prevent sticker-shock, this method gives stakeholders the opportunity to compromise, making it more likely that at least some of your proposal will be accepted (and you can always expand it in the future).

Potential Funding Sources

In your presentation, it's imperative that you suggest some possible avenues for funding the program. They may or may not be pursued, but including them indicates to the stakeholders that you've thought the project through.



1. The method of choice is the obvious one: university departments such as facilities, dining, or housing can add line items to their budget to cover compostables purchasing and compost collection costs. The easiest way to facilitate this is by demonstrating cost savings that can furnish the needed funds (see below).
2. Green Funds: Most universities have a green fund, often supported by student fees. The fund provides resources for projects that encourage sustainability. Most funds allow faculty and students to apply in the form of grants, which is a way to engage students in research and project proposals that will have a positive impact on the campus community.
3. State Grants: Many states have funds for the development of programs that can also apply to college projects. Check environmental/solid waste, agricultural, and economic development departments at the state level for possible resources.
4. A few campuses with established compost collection programs have been able to partner with local towns and provide service to local citizens and earn revenue for the campus. This is a growing trend, along with campuses generating surplus compost and marketing it for sale.

Cost Savings

A list of places where the university may save money, as well as estimates of the cost savings, is important to include in your proposal. Potential savings will be different for each campus, but here are some areas you should look into:

- Using compost instead of chemical fertilizers.
- Trash hauling costs with and without organic waste included.
- Using contractors instead of school staff for portions of the compost program.
- Using student employees for portions of the compost program.
- Compost as a tax-deductible donation to the local community and non-profits.

When presenting these opportunities in your proposal, be thorough. Interview the appropriate stakeholders to develop your proposal in as much detail as possible. Reach out to external companies for quotes or find listings for your required products and services to relieve the burden of researching alternatives from the stakeholders.

Pilot Programs

With any proposal it's vital to include suggestions for first steps. It can act as a call-to-action and provide the push necessary to get the ball rolling.

Does your campus already have some form of compost program? It's possible that there is, or was, a previous composting initiative that was mismanaged, had insufficient scope, or fell to the wayside for some other reason. Suggest revitalizing the old project as a trial run (and feel free to expand the scope as necessary). Starting with the familiar is easier for some people to stomach.

If there's no foundation already in place - don't worry about it! Sometimes it's easier to start from scratch than to attempt to shoehorn your ambitious ideas into an existing framework. Pitch a small portion of the ultimate goal! Make sure to choose a portion that has measurable criteria for success and a relatively short time scale (such as holding a Weigh the Waste event or creating a cold compost pile in an existing garden space).

The goal of a pilot program isn't necessarily to have a huge impact on the waste generated on your campus. It's a chance to convince stakeholders that a) it's feasible to make progress with composting and b) you're capable and competent enough to lead the charge.

Don't be intimidated! Set achievable goals for the pilot program that will clearly illustrate both success and potential for growth. In the best case scenario, your pilot program will take less than 6 months to a year to come to fruition, that way you can keep the momentum going and aren't in danger of graduating before it's complete.

Laying It All Out: What to Include in Your Final Proposal

Creating a proposal is a daunting task. The document needs to be persuasive yet honest, professional yet personable, and thorough yet interesting. Most senior theses only hit two or three of those criteria, so this manuscript will be on a whole other level.

Don't stress out too much. PLAN can help you with more details if necessary. The following is a list of sections to include in your proposal:

Executive Summary

- Concise one-pager that sums up the key points of the document and emphasizes the potential benefits. Seriously, keep this to one page! Lots of administrators have very limited time and will only read this section. Make sure it is short but contains all the crucial information.

The Team

- Include student leaders, any "champions" from faculty/staff, and key stakeholders that have already pledged support.
- Include relevant information such as names, job titles, and any related experience.

The Goal

- Describe the ideal implementation of your compost program. This is a broad-perspective overview, so don't get bogged down in the details.
- It's okay to be grandiose here - you can shoot for a zero-waste campus.

Cost-Benefit Analysis

- Start by describing the costs you will incur, and end on a happy note by finishing with the savings and benefits.
- Make the financial case clear. Compare your suggestions to existing solutions and outline clearly and honestly the pros and cons.
    - If you know any details from other campuses, feel free to include them as a positive case study!

- Make the environmental case clear. You can use both logical arguments ("this will qualify us for a grant from the state") and emotional arguments ("this will position us as a leader of sustainability in higher education").
- Numbers, numbers, numbers. You should drown this section in statistics, both the good and the bad. Some people make decisions based on numbers alone; everyone else will be impressed by the effort you put in.

Operations

- This is the section with all the details. Explain every facet of your proposed program. A good principle is to imagine you are reading this draft, and to think of all the questions you might ask. Answer all those questions before they have a chance to ask! Here are some examples of things you might include:
    - Training and education for faculty, staff, and students - for both those who will run the program and for everyone else who will participate in it.
    - Collection system and procedures.
    - Possible locations for infrastructure.
    - Pros and cons of types of composting systems as applicable to your campus.
    - Costs, both initial investment and maintenance, of each proposed system.
    - How the proposed program will be rolled out - the permissions necessary, securing the expertise, fund allocation, staffing, etc.

Timeline

- Come up with a proposed timeline for the project. Don't get too attached to the dates since they're likely to change, but it's important to be realistic about estimates. You may have graduated or otherwise moved on before it's complete - and that's okay.

Pilot Program

- You've just asked a lot of the stakeholders, so now we're taking it down a notch. Suggest a much simpler (and cheaper) pilot program that would be hard to say no to. If it's successful, you've already got your foot in the door and your plan in their hands. They're more likely to back a project that's already seen milestones completed.

Obstacles and Solutions

- Anticipate their objections and address them on your terms. Where will the money come from? Maybe "green fees" added to tuition, or another funding mechanism present on your campus. How will the program sustain itself? Through compost sales. Create a question-and-answer list like the Frequently Asked Questions page on a website; feel free to point to external resources with more information.

5

Education, Outreach, & Advertising your Compost Program

User-Friendly Bin Design, Setup, & Signage

Having an established composting system on your campus won't do any good if no one uses it. It needs to be both intuitive and simple to use so that even people who aren't passionate about waste will participate.

Standardized bins and signage at UC Berkeley[13]

Here are some bin design best-practice tips:

- What color means "compost" to your campus? Green is the color most commonly used to denote compost, but it may already be in use for trash or recycling.[14] If there are any existing organics disposal projects on campus or in the surrounding community, it's important to be consistent with them. Contradictory existing waste stream systems invite confusion.

- Labeling on all waste streams should be consistent too. Use identical signage — words, symbols, imagery, and even fonts should be the same across all waste receptacles to remove the need to "interpret" signs.
- In locations that service multiple waste streams, try to implement "waste stations". A waste station consolidates every receptacle into one easily recognizable location, making it easier for students, staff, and visitors to use them. Be sure to have every waste station identical too - it should always have the same arrangement of waste streams (i.e. Trash-Recycling-Compost bins from left to right).
- Compost bins should have a lid on them that can be closed securely to minimize the escape of odors and the potential for invading pests. Consider lids with charcoal filters to reduce odor.
- The size of receptacles will vary across campus depending on the traffic through a particular location, and the amount of waste generated there. While compost bins may be much larger in the dining hall than in an office building, be sure that the shape, color, and overall physical characteristics remain consistent.

Education and Outreach for Program Longevity

Campuses are rife with different avenues for education and outreach year round. A successful compost program requires everyone to pitch in, so you'll need to strategically consider which avenues are worth putting time and resources into to make the maximum impact and reach as many people as possible.

In the early stages of launching your project, make sure to reach out to the student newspaper, radio, social media, and other campus-specific forums to get the word out about your program. Get in touch with these platforms to request publicity at critical times (i.e. during orientation week, campus concerts, sporting events, etc.). As long as you get in touch ahead of time, they'll be happy to help (and happy that someone is actually listening to the campus radio).

There are numerous clubs and student groups who can be tapped on to promote, provide support, and implement composting projects, from environmental science

and outdoors clubs to sustainability/environmental, forestry, agricultural, and gardening clubs.

Examples of Clubs at US Campuses Involved in Composting Programs

- WSU Environmental Science Club
- UMD- The Wildlife Society
- MSMU-Outdoor Adventures club
- UMD- ENspire, Student Advisory Board
- TU- Environmental Science and Studies Club
- UK- Agronomy Club, American Society of Landscape Architects, Outdoor Pursuits
- UK- Environmental Science Club
- UK- Horticulture club
- Penn State college of agricultural sciences, Texas AM school
- UK- Student sustainability council
- UK- UK Greenthumb
- Uk- University of Kentucky Student Chapter of the Society of American Foresters
- Iowa State- environmental science club, the green umbrella, leaders for a sustainable community, soil and water conservation club
- PSU- sustainability institute
- Harvard- ecology journal
- Coe College- sustainability council, environmental club, biology club, chemistry, Coe Outdoors

Faculty members can help staff and students disseminate the information on official modes of communication, such as campus listservs and public display boards. Find out about tabling events in advance and be sure to have a presence at every one.

Also think critically about other, less-utilized avenues for advertising. Consider showing up at unexpected places on campus, such as the inside of bathroom stalls (an old PLAN favorite.) There are many competing interests so be sure to stand out!

Constantly be advertising ways that students can get involved in your program, whether that be through volunteering, internships, trainings, or workshops. If your school has a requirement or an incentive for volunteer work, try to have your program qualified.

Institutionalizing Compost Programs

For many compost initiatives, this is the final milestone of a successful program. Having the university officially recognize and integrate it into their own operations all but guarantees its long-term viability.

Naturally, warm compost systems and other high-cost infrastructure will have necessarily included campus higher-ups from the start, and may even have been initiated by faculty or staff. Even less-involved compost programs, such as collection + outside contractors can benefit from institutionalization, however.

Composting should be a regular, mandatory process on campus. Both students and staff will need to be educated on proper procedures. That means including composting information during orientation for new students and transfers, as well as staff on-boarding and training. Until composting is a universal norm, this process will need to be repeated with each new student and staff member.

The school will likely need to develop new materials to instruct students and staff, so offer the expertise of your team. Contact your PLAN Campus Coordinator if you need further assistance; we'll be happy to facilitate the process.

Events and Engagement

Any campus event can be an opportunity to educate and do outreach around proper waste disposal on campus. And, by regularly incorporating composting into campus events, you're taking steps towards ingraining composting and sustainability as a part of campus culture.

Zero waste stations and volunteers at an Appalachian State athletic event[5]

Depending on the nature of the event, your involvement may be as simple as setting up a waste station or as involved as recruiting

volunteers to do tabling. Communicate with the event organizers and stakeholders well beforehand to both get permission to participate and to strategize how your team can be most effective.

Events can be a great way to both advertise and inform students and staff about composting and zero waste tenets, but don't try to steal the show or go overboard with your efforts. There's no need for tabling at the end-of-the-year club soccer party, and it's unlikely that a composting soapbox will be welcome at an event celebrating the cast of the latest musical. In these cases, waste-management should be seen and not heard.

On the other hand, there are absolutely times when you should go all-out. When all of the campus organizations get together to showcase themselves to incoming freshmen, feel free to have the loudest and trashiest display imaginable. Hold your own events, such as a Trash Sort. Operations necessary to compost programs, such as a waste audit, can be made into public education events with a few well-placed signs and volunteers.

Lobbying for Local and State Regulations

6

You've done your due diligence: completed a waste audit, pulled together program stakeholders, and researched state and local permits. Unfortunately, some come to the conclusion that their campus is in a "Compost Desert" - a place where no facilities, farms, or even permittable zoning exists for a place to compost.

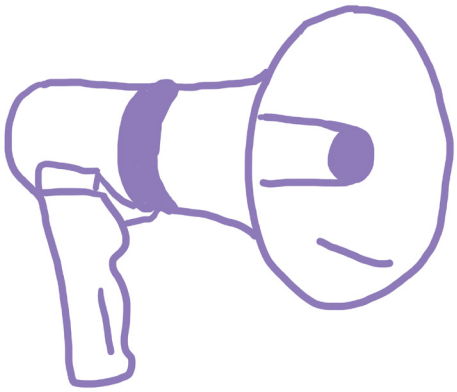
It's time for advocacy!

Fortunately, campus partnerships between staff and students are perfectly poised for influencing your local and state governments. You have a powerful and credible voice.

How to Advocate for Composting

Identify Existing Policies

Is composting allowed in your city/town/ county zoning?



Some municipalities still only allow composting as a supplementary activity to farming, which reflects zoning code prior to the advent of compost as a green business. See the US Composting Council's model rules for state permitting for ideas for composting operation sizes your zoning officials could implement into their zoning code.

Are your state's permitting rules for composting prohibitive or non-existent?

There are unfortunately still states that regulate composting as a solid waste activity, with high fees, engineering requirements, or other barriers to entry designed to mitigate landfill impacts that aren't relevant to compost facilities.

Identify Your Allies

See if your campus has a government relations staff. Most large universities have a government relations department that is responsible for interfacing with local and state government on the university's behalf. Smaller colleges may have one person coordinating that effort. Meet with them and explain the composting gap to find out if they can help to coordinate your campaign.

Check if the US Composting Council has a chapter in your state that may be working on this already at www.compostingcouncil.org/chapters. If not, contact the USCC to get background on activity going in your state. The USCC will also connect you with other advocates in your state/region who can add weight to your voice.

Look for community stakeholders who can amplify your voice. Does your town or county have a zero waste group, a Sierra Club, another environmental group chapter, or a Sustainability Committee? These are good partners, and they're likely already working on the problem.

Communicating with Local And State Representatives

Once you have a good sense of what you need to ask for, draft a letter outlining the benefits of compost (see compostingcouncil.org/factsheets for resources). In the letter, ask what steps are being taken to begin organics collection and compost production in your region. Send the letter with signatures from as many relevant parties as possible.

To contact your local city/town, county, and state officials:

Search the web with the name of your town (or the closest one, if you are not in a town/city) and the term "elected officials" - once you find the website you can usually find contact forms or email addresses to reach out to them.

To find your state representatives's contact information, use your school's zip code and the Open States website tool.

Send your letters by email and snail mail. Electronic mail sometimes ends up in spam or hidden in overloaded email boxes. Don't underestimate the value of physical mail - it's often considered more personal and significant.

Follow up. If you haven't received a reply within two weeks, prompt them again. While it's unreasonable to expect resolution within a couple weeks, you should have at least received acknowledgement.

Getting Technical

7

The Fundamentals of Composting

"Compost" is a product manufactured through the controlled aerobic, biological decomposition of biodegradable materials that have undergone mesophilic and thermophilic temperatures (which significantly reduces the viability of pathogens and seeds) to create a medium beneficial to plant growth.

This definition, used by AAPFCO (the American Association of Plant and Food Control Officials, which oversees federal and state definitions for soil amendments and fertilizers) is important as you plan how you will compost your green and food waste. The biological principles of composting are the same, no matter what scale or technology you use.

What Does Effective Composting Look Like?

Combining raw feedstocks (compostable organic materials) and mixing them to introduce air begins the process of composting. It is important to begin mixing as soon as a pile is built to jumpstart the composting process. Short-lived odors often result, though, so don't be surprised!

Aerobic microorganisms consume oxygen during the decomposition process. Feedstock types, preparation, and mixing have a significant impact on the speed of decomposition because they determine how compact the piles are and how much air can penetrate. Breakdown of materials can stop entirely if mixing is insufficient or feedstock particle size is too large. Mechanical mixing and forced aeration (ASP systems) replenish air space within the compost pile.

Heat is another important factor in determining the speed of decomposition. Heat is naturally generated as a result of the metabolic processes of the microbes, and is retained by the mass of the compost. Pile temperatures follow a pattern of quickly moving to 120-140 degrees F (lasting for several weeks), then dropping to 100 degrees, then stabilizing at ambient air temperature.

It's important to monitor the pile to ensure it is passing through the thermophilic (hot) and mesophilic (warm) phases as required in the Processes to Further Reduce Pathogens (PFRP) regulations. This process is what destroys dangerous pathogens and removes unwanted seeds from compost.

Monitoring compost for temperature and pests[5]

Carbon to Nitrogen Ratios

As a general rule, the ideal carbon to nitrogen (C:N) ratio is 30:1. The ratio can be increased to slow down composting and maintain aerobic conditions by reducing oxygen demand. In the case of high nitrogen feedstocks, higher carbon ratios will further slow down the process and preserve nitrogen. Because high carbon materials are often bulky and dry, a higher ratio will provide more air space.

Feedstock should be thoroughly blended if varied sources are included. If you accept food scraps as well as green material (grass/leaves), be sure they are adequately blended or you risk creating a scenario where certain materials are preferentially decomposed - leading to anaerobic pockets.

Feedstocks

You'll need to develop a compost feedstock recipe. These are based on the following parameters of each feedstock.

- Carbon to nitrogen ratio (C:N Ratio)
- Moisture content
- Bulk density
- Porosity of the mix (available air space)

Most state soil labs can provide this information if you can provide them with a composite sample of each of the feedstocks that you are composting.

Developing a composting recipe is a balancing act because both the C:N ratio and the moisture content need to be within acceptable ranges. Trial and error is one way to choose feedstocks but you should rely on a basic recipe of carbon sources (such as wood chips, sawdust) to nitrogen sources (grass, manures, food waste), and try to stick to it as much as possible.

For example, if you have a steady source of wood chips, or know that you have a measurable and reliable amount of food waste, it is easier to focus on finding diverse sources for the rest of your recipe.

Usually either the carbon or nitrogen range becomes the baseline for measuring the rest of the recipe; choose as a baseline the feedstock to which your compost has the easiest and most readily available access.

With wet materials such as food waste, the moisture content is critical. High moisture leads to anaerobic conditions, odors, and slow decomposition. Having more carbon than nitrogen is less problematic, so it is usually best to base your recipe on moisture content and then work to supply the necessary carbon.

Odor

Odor issues are among the most challenging management issues that outdoor compost facilities face. They are likely to cause problems if neighboring homes and businesses "catch wind."

Here are some common solutions to odor issues:

- Mix problematic materials offsite or immediately upon arrival. Design a "receive basin," a horseshoe-shaped area with ready-to-mix carbon bulking agents and the delivered food scraps / manures adjacent to each other.
- Enclose/aerate the receiving floor.

- Add pH adjusting materials upon receipt of material.
- Minimize receipt of problematic (odor-wise) feedstocks such as grass, grease trap waste, and septage.
- Have alternative outlets available in the event you have an excess of a particular feedstock (for example, wood and green material make great boiler fuel).
- Grinding materials when environmental conditions are ideal (strong winds that are blowing away from receptors, etc).

Ultimately, these are the sorts of problems that are best approached by an expert. We strongly recommend compost facility operators to take a rigorous course from an accredited composting training facility. Reach out to the USCC for help if you can't find one in your area.

Curing

Curing is an additional phase in which your organics continue to decompose - though at slow rates and low temperatures.

Remaining areas of excessive heat are signs that the pile is not ready for curing. Hot spots may also indicate that the pile did not finish decomposing because it was too dry. Moving it may reinvigorate biological activity and generate heat.

A compost curing pile[5]

Be careful not to move your materials to a curing pile prematurely or you risk your curing pile becoming too large or dense. It can cause the decomposition to switch to anaerobic and you'll have to deal with odor.

Stormwater and Leachate

Rainfall that comes in contact with your compost operation may carry away sediment and dissolved nutrients. This is regulated under the National Pollutant Discharge Elimination System by state and federal regulators for operations sized an acre or more.

Your campus already has experience complying with stormwater regulations, so consult with your Facilities Department for assistance. Large compost programs may require a specifically-built stormwater retention basin to manage the runoff.

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Space and System Considerations

The location of your composting facilities is vitally important. Some factors to consider:

- Is the area zoned properly for your operation?
- What is the total operation size? Is there a buffer area to give neighbors some space?
- You need more space than just that which the compost piles occupy. Is there room for a staging area for feedstock and curing material?

Types of Composting Systems

Compost systems can largely be broken up into two groups: aerobic systems and in-vessel systems. Each have their pros and cons.

Aerobic Systems

These are what you imagine when you think of compost piles. They're outdoor piles of food waste that require labor to operate. Here are some examples of common aerobic systems.

Students tending to an aerobic composting system[5]

Three-Bin Systems

The traditional compost system and a great place for beginners to start. It's ideal if you have a footprint of at least 5' x 5' x 4' (4ft tall is the minimum depth needed to reach 160 degrees) and food scrap generation of under two tons per month. You may need a four-bin system if you regularly exceed that, or a different system with a larger capacity.

Three-bin systems operate well within small start-up composting projects staffed by student workers, or as small pilot programs in a back-of-house kitchen. For most campuses, this system will be insufficient to manage the entirety of the food waste generated.

Even with three-bin systems, you'll need committed labor (volunteer or otherwise) to turn, water, and monitor the compost, as well as a small storage shed or area of equal size for tools and access to water.

Windrow Composting

Windrows are normally 6 to 10 feet high, 15 to 20 feet wide, and can be several hundred feet long. They are turned regularly, with pre-mixed raw material (i.e. mixed before it gets to the pile) or mixed in with the pile. The shape and size vary depending on the climate, the equipment you used, and the feedstock.

The huge footprint of the pile itself is not the only space consideration. Windrows require heavy machinery to manage, which will need its own (large) building for storage. A tractor may be able to stack and turn a pile that's six feet tall, but specialized equipment will be required for larger windrows.

Aerated Static Pile

Aerated Static Pile (ASP) composting is comprised of a system of pipes under the pile that are connected to blowers. The blowers either suction air from the pile or blow air into the pile to ensure constant aeration.

The best feedstock mix for this system is porous material, such as wood chips or straw. The nitrogen sources (food scraps or manure) are sandwiched between the top layer, which can be made of finished compost or sawdust to absorb odors, deter flies, and keep in moisture and heat.

ASP piles are good solutions for space-constrained campuses, and can even be modular. The pile can expand as the amount of material you collect goes up. Slow scaling is recommended; for example, a three cubic yard system could easily "scale up" for a six cubic yard system. As you grow, though, check with your local and state regulators to be sure additional permits are not needed.

In-Vessel Composting

If you are strapped for space, your campus may want to consider an in-vessel system. These systems allow you to batch your feedstocks and produce little to no leachate or odor when operated properly. The system you choose will be driven by your feedstocks, how much money you have to spend, and your site.

In-vessel units range in type from vertical plug-flow, horizontal plug-flow (meaning they are loaded on a periodic basis while processed material is discharged from the other end of the system; air is piped into travel through the composting mass), or agitated manually to incorporate air brought up through the floor of the system. Biofilters are included with some units (they can be filled with finished compost or wood chips to control odors).

Planning aside from the unit you choose is also necessary:

- Sources of feedstock and carbon material (sawdust, woodchips, etc.) must be nailed down well before you start in order to avoid odor issues from the high nitrogen base of your food scraps.
- Handling of the feedstocks - from possible pre-treatment equipment to de-water your material, to macerators and grinders to prepare the material - must be investigated. These are needed not only for transport (especially if your food waste is heading off campus), but for loading and reducing particle size for faster composting in the unit.
- Mixing and loading machines for a thorough mix of the feedstocks pre-loading may be necessary, unless your system is a rotary drum and mixes inside the unit.
- Designate a location for the curing of your compost from weeks to months, depending upon the system, to allow microbes to complete their work and for the material to cool before it can be used.

8

Afterword

Conclusion

If you still feel like you're not ready to start a compost program on your campus - that's ok!

Like we said before, this guide isn't meant to teach you how to run a compost program from start to finish. It is meant as a primer to boil down an intimidating task into something a little more manageable, to give you an idea of who you need to talk to in order to get the ball rolling, and to equip you with the tools necessary to persuade stakeholders and win allies to your cause.

If you still need help - information, partnership, moral support, or whatever - please reach out to either PLAN or USCC. We have helped people just like you implement a compost program on their campus before, and we'd be glad to give you support too.

For Additional Resources and Sources, please view the online version of the manual at postlandfill.org/manuals.

Additional Resources

Composting in America (prepared by U.S. PIRG Education Fund) - arguments & best practices for composting
https://www.waste360.com/sites/cet.com/files/USP%20Composting%20in%20America%20%281%29.pdf

Compendium of Organics Recovery Programs at Colleges and Universities
http://curc3r.org/wp-content/uploads/2016/10/EPA-reg-4-Compendium-Report_FINAL_October-2015.pdf

Compost Equipment Guide for Small-Scale and Institutional Uses
https://www.compostingcouncil.org/page/EquipmentGuide

Vermont DEC: Turned Windrow Composting Sizing Your Composting Pad
https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/ANR%20Sizing%20Your%20Composting%20Pad.pdf.

On Farm Composting Handbook:
https://campus.extension.org/pluginfile.php/48384/course/section/7167/NRAES%20FarmCompost%20manual%201992.pdf

The Ins & Outs of In-Vessel Composting
https://resource-recycling.com/recycling/2019/03/30/data-corner-the-ins-and-outs-of-in-vessel-composting/

Vermont DEC: Food Waste Generator Calculator
https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal-Recycling/FoodScrapVolume_Estimator.pdf

Feedstock Recipe resources
https://compostingtechnology.com/tools/compost-calculator/
http://www.compost.css.cornell.edu/download.html

Rice University Composting Proposal Example
https://docs.google.com/document/d/1_u69v_7P2Z4cDuNGMXEiqR_JJidHKZb3n3EB34t7bkM/edit#heading=h.209r08l11ee9

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