National Wildlife Federation®
CAMPUS ecology®

Ohio University
Athens, Ohio
Solar Powered, In-Vessel Composting

SCHOOL

Ohio University is a public 4 year university with 29,486 students in Athens, Ohio.

ABSTRACT

Ohio University launched a solar powered, in-vessel composting system in February 2009, the largest of its kind at any college or university in the nation. As of July 2009, over 70 tons of organic waste has been diverted from the campus' solid waste stream. The system is designed to accept 2 tons of material per day, with an overall capacity of 28 tons. The compost facility site boasts a number of sustainability features, including a rainwater harvesting system and a 10.03 kW roof- and pole-mounted photovoltaic array, projected to provide at least 50 percent of the electricity needed for operation of the site. Capital start costs for the compost facility and equipment were about $800,000.

GOALS AND OUTCOMES

Goals

- To achieve a 50 percent rate of capture of the organic waste stream within the first year of operation;
- To educate the campus community regarding new waste sorting procedures and the need to minimize overall waste;
- To improve the health and fertility of our grounds (both on the Athens and regional campuses) through the provision and application of nearly 900 tons of compost per year as a soil amendment;
- To demonstrate tangible cost avoidance and environmental benefits realized by the composting initiative in order to justify further expansion;
- To provide an opportunity to the larger Athens community to divert organic waste;
- To provide a model of in-vessel organic waste composting for other universities and large-scale institutions in Ohio and in the larger region.

Accomplishments and Outcomes

As of June 2009, three dining and food preparation facilities are online, including the food court at the main student center. We plan to include the remaining dining facilities, including three more dining halls, by the fall of 2009. The diversion rate at the central food processing facility is estimated to be about 25 percent of all solid waste, including recyclables.

Between February and early July, 2009, 73.3 tons of organic waste were diverted from the waste stream via the in-vessel composting unit, including pre- and post-consumer food waste, landscaping waste, animal bedding and manure, sawdust and biodegradable service ware. Landscaping waste was already being composted at Ohio University, as Ohio outlaws sending this waste to a landfill. Thus, the total additional organic material composted since the launch is 34.48 tons of food waste. This has resulted in the equivalent of over 128 metric tons of carbon emissions avoided thus far. We estimate that the site will process approximately 120 tons of material per year once all facilities have been brought online. This will result in the avoidance of over 450 metric tons of carbon emissions per year. Since February, over 27 tons of finished compost has been produced which we plan to apply on campus grounds.

The photovoltaic array is projected to produce approximately 12,000 kWh of electricity annually. We expect that to account for roughly 50 percent of the energy needs of the site. Between February and June, 2009, the array had produced 5,283 kWh, resulting in the equivalent of about 5.8 tons of avoided carbon dioxide emissions.

The composting site also includes a rainwater collection system that is able to hold 2,000 gallons in the underground cistern. The water collected has provided 100 percent of the necessary water to date, and no municipal water had been used at the site. However, it's been a good rain year so far. We anticipate having to expand the cistern or resort to transporting water in drier seasons.

There have been no direct cost savings associated with the in-vessel compost system thus far, but savings are expected as the need for dumpster collection is reduced. However, there will not be a one-to-one relationship of tons diverted to tons land-filled. One of the reasons for this is that much of the food waste was previously going down the drain into the sewer lines. Economic value has been generated through the production of 27 tons of compost to date, with an estimated market value of over $2,500.

The compost system is already serving as an educational tool for the campus and wider community. Through the installation of compost waste bins, news coverage, site tours, outreach at eating areas, and awareness campaigns, thousands of individuals have come into contact with the project. The system has also been recognized as a model of in-vessel organic composting and renewable energy systems for the region, as demonstrated in state and national publications, such as Geo News (12/2008), and NACAS College Services Magazine (10/2008). In addition, many universities in Ohio and elsewhere have visited the in-vessel compost site both online and in person.

Challenges and Responses

During the implementation phase, the project was thrown a curve ball when the Ohio Department of Development changed the minimum size requirements for the solar array in order to qualify for their subsidy program. As a result, we chose to increase the capacity of the system from 4.93 kW to 10.03 kW. This required additional matching funds on the part of the university.

Another unexpected change in design was the on-site septic system which we did not believe would be required in the original proposal. A leach bed had been planned to handle run-off from the site; however the Ohio EPA later mandated that a complete septic system be installed. Connecting to an existing sewer line was not a viable option for cost reasons.

A challenge discovered during operation has been that some of the compostable service ware used at our food court has not been breaking down the way we anticipated it would. The university has been experimenting with alternative compostable options and discussing the possibility of purchasing a shredder, but has yet to come to a conclusion.

Along with these unexpected challenges, waste sorting has been an anticipated challenge that was identified early on in project planning. After performing four separate waste audits in a campus dining hall, we found that the average diner was trashing over 5.5 ounces of post-consumer edible waste. This was remarkably high, considering, for example, waste audit results from Harvard of 3.3 ounces per person per meal. A "No-Tray Day" audit reduced that amount to 4.5 ounces, which was less of a reduction than expected. While these findings support the need for composting, it also reminds us of the on-going challenge of reducing overall food waste.

Campus Climate Action: Your School's Carbon Footprint
Throughout the process of developing a plan for the composing system, impacts on climate change were a significant consideration. The main function of the project is to divert organic materials from the landfill while providing natural, healthy fertilizer for the campus grounds. We chose to add a renewable energy system to the site to further minimize the project's carbon footprint.

As of June 23, 2009 the solar panels have produced 5,283 kWh of energy, avoiding 5.8 tons of carbon emissions. In addition waste diversion is estimated to reduce 128 tons of carbon emissions, resulting in a total reduction 133.8 tons of carbon emissions for the project so far. In addition, compost will be used as an alternative to chemical fertilizers on campus grounds, further reducing carbon impacts.

Commentary and Reflection
One of the things that I would caution others against is trying to justify a campus composting initiative based on cost avoidance as the main motivator. Although it is true that there is cost avoidance associated with the project, you will get nowhere fast by telling people this is a money saving initiative. It just doesn't pay back quickly enough, and it's also fairly challenging from an administrative perspective to coordinate. So it has to be a labor of love, in the end. And it has to be understood as something the college is pursuing because it is the *right* thing to do.

Also, you want to get a multi-sector team of people involved right from the get-go, and keep them involved all the way through implementation. It's great if you can mobilize funds from both Dining Services and Facilities the way we did because then there's a sense of real buy-in all around.

Many dining staff members have found it just as easy, if not easier, to manage organic waste by separating it rather than sending it down the drain or dumping it in the trash. Although there was some initial resistance to the project when it was still in its planning phases, I think that people were ultimately surprised at how simple it was to get the kitchens in the game.

ENGAGEMENT AND SUPPORT
Leaders and Supporters
The Office of Sustainability coordinated the composting project from the start under the leadership of the Facilities department, working closely with the Department of Refuse and Recycling. In later stages of the project, Dining Services, Grounds, and our Planning & Construction departments became more involved. In addition to those key figures, many students, both graduate and undergraduate, contributed to the project in all stages of development.

Funding and Resources
The total start-up costs associated with this project were approximately $800,000. The property where the compost facility is located was already owned by the University.

Ohio University received grants to cover about $335,000 of the initial costs. These grants were provided by the Ohio Department of Natural Resources, Division of Recycling & Litter Prevention and the Ohio Department of Development. The grant from ODOD was a per installed kW subsidy for the photovoltaic array.

The balance of the start-up costs came from the Facilities department and Auxiliaries. On-going operational costs are being managed by the Facilities Management department, the Grounds department, and Dining Services. Electricity costs (beyond what the solar array produces) are paid through our general utilities budget.

One full-time employee manages the site. That position is housed in the Grounds department. One additional student worker is employed for approximately 20 hours per week.

Education and Community Outreach
Outreach to the campus and larger community has been a consistent part of the compost project right from the beginning. Outreach started long before the compost system was up and running. Classes worked out designing communications campaigns. Patrons were also asked to sort their waste into appropriate bins at the Food Court at the new student center which opened in January 2007, a full year before the compost machine was actually online.

In addition to signage in the waste areas and flyers handed out to food court patrons, volunteers and employees of the Office of Sustainability have spent time at the waste areas informing the public on how to sort properly, while letting people know the composting system is up and running and answering questions about the project as a whole.

In addition, table tents were placed in all dining halls to inform students the composter was online and why Ohio University has started composted (also featured on the website above). On February 12, 2009, a ribbon-cutting ceremony was held, which included major university stakeholders (including the President) as well as guests from around the state and region.

The composting site was also the kick-off spot for the Southeast Ohio GEO Solar Tour in October 2008. The tour highlights sites in Athens and Hocking Counties that feature sustainable energy systems.

CONTACT INFORMATION
Contacts
Sonia Marcus, Sustainability Coordinator
740-593-0026
marcuss@ohio.edu
www.ohio.edu/sustainability

Case study submitted by:
Molly Shea, Student
Anticipated Graduation: Fall 2010
740-593-0460
ms114706@ohio.edu

MORE ABOUT YOUR SCHOOL
Campus Sustainability History
The Ohio University Office of Sustainability was established in May of 2006 (www.ohio.edu/sustainability), the first of its kind at any public college or university in the state of Ohio. Prior to and since the creation of the office, the university has been involved in a range of programs aimed at conserving resources, reducing energy consumption and diverting waste. RecycleMania was born here in 2001. Programs of the Office of Sustainability include coordination of Presidents' Climate Commitment, the OHIO Ecohouse, the Green House Project, Earth Month, and the Residence Challenge.