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## *UW-Oshkosh develops nation's first dry fermentation anaerobic digester*

For years, the sustainability initiatives of the University of Wisconsin-Oshkosh have made the campus an environmental leader in the UW system and throughout the nation. In a recent Sierra Club ranking, UW-Oshkosh—the only Wisconsin institution to make the list—was named the 35<sup>th</sup> most environmentally conscious college in the nation. One of the factors responsible for the university's high position was Oshkosh's construction of a dry fermentation anaerobic biodigester, the first commercial-scale system of its kind in the Western hemisphere, according to BIOFerm Energy Systems, its Madison-based developer. The construction of the facility was completed in May 2011 and preparations for operation were made throughout the summer. The biodigester was loaded with feedstock in early autumn and had accumulated enough biogas to begin producing energy in early October.

The unique design of the facility flows from its diverse energy sources, which range from community-supplied yard clippings to UW cafeteria leftovers. While the facility employs the same biological process as so-called "wet" anaerobic digesters that are fed a manure-based slurry, UW-Oshkosh's biodigester will perform its biological conversion on dryer, solid feedstock. Mike Lizotte, UW-Oshkosh director of sustainability, described the range of energy sources that can be fed into the system. "The largest portion of the system's feedstock will come from supermarket-supplied food wastes consisting of outdated meat, dairy, bakery, fruits, vegetables, and other unsalable products. Yard waste collected from Oshkosh's 66,000 residents, winter bedding waste from a local dairy farm, and campus food waste will also be used." These organic materials are loaded into four 70-foot-long, oxygen-free chambers, where microorganisms break down the waste. The biogas produced as a result of decomposition fuels the combined-heat-and-power (CHP) turbine engines.



### **Biodigester Specifications**

- Total Building Area = 19,000 ft<sup>2</sup>
- Total Fermenter Volume = 26,887 ft<sup>3</sup>
- Storage Area = 2,000 ft<sup>2</sup>
- Mixing Area = 7,800 ft<sup>2</sup>
- Feedstock Capacity = 8,000 tons
- Electrical Capacity = 370 kW
- Average output: 2.32 million kWh/yr
- Utility: Wisconsin Public Service
- Year of installation: 2011
- Installers:
  - BIOFerm Energy Systems
  - The Boldt Company
- Incentives:
 

Focus on Energy grant	\$232,587
U.S. DOE grant	\$500,000
<b>Total</b>	<b>\$732,587</b>

### **Further Information:**

#### **UW-Oshkosh**

UW-Oshkosh Today - Online News  
 "Switch flipped: UWO biodigester producing energy"  
 October 12, 2011

<http://www.uwosh.edu/today/14737/switch-flipped-uwo-biodigester-producing-energy/>

#### **Biomass Power & Thermal Magazine**

"Living, Learning Lab"

<http://biomassmagazine.com/articles/5693/living-learning-lab>

#### **Milwaukee Journal Sentinel Online**

"Biogas plant to supply energy to UW-Oshkosh"

<http://www.jsonline.com/business/112809279.html>

The 19,000 ft<sup>2</sup> facility is capable of handling 8,000 tons of feedstock per year. With a capacity of 370 kW, the generators can produce up to 2.32 million kWh of power annually. Distribution of the energy to campus buildings is feasible, but for now, the electricity generated is sent to the central grid and sold to Wisconsin Public Service through a 10-year power purchase agreement. The revenue generated over the lifetime of the facility will support student scholarship funds and other academic programs at the university. The \$3.5 million system was financed through a series of bonds by the biodigester's owner, the UW-Oshkosh Foundation. The project also received a \$232,587 grant from Wisconsin Focus on Energy and a \$500,000 grant from the U.S. Department of Energy. In financial terms, the facility could produce enough energy to pay for itself in 7 to 10 years, but the biodigester has already become one of the university's most unique educational assets.

UW-Oshkosh students play an important role in the biodigester's ongoing operations, and the facility also serves as a hands-on learning laboratory for biology and environmental studies students. Ryan Bartell, a student working at the facility, said it has been valuable to see the strong connection between the biodigester and community. "The biodigester is a perfect example of the application of science to a real world problem, and seeing both the logistical and scientific sides of the solution has been a terrific learning experience," he said. According to Greg Kleinheinz, UW-Oshkosh professor of microbiology, "the biodigester is an excellent model of how academic institutions can be creative and entrepreneurial while fulfilling their education missions in an environmentally and sustainable way." Just one month before operation began, UW-Oshkosh received the 2011 Silver Waste-to-Energy Excellence Award from the Solid Waste Association of North America (SWANA) for development of the biodigester. This is a significant honor for UW-Oshkosh, as the SWANA competition covers the technology, economics, community relations, worker safety, environmental advantages and aesthetics of the facility. The UW-Oshkosh Foundation is also involved in examining and developing the financing and engineering plans for a second "wet" anaerobic biodigester at Rosendale Dairy, the state's largest dairy farm in Pickett owned by Milk Source. Operating as a remote laboratory for UW-Oshkosh, this project, featuring a public education center, would channel revenues from energy sales into student scholarships and campus laboratory enhancements. When the appropriate permits and financing arrangements are set in place, construction of the facility should begin in spring 2012, with a projected biodigester startup in 2013.