



Technical Education and Analysis for Community Hauling and Anaerobic Digesters (TEACH AD)

TEACH AD Webinar Series - September 30, 2021

The Multiple Aspects of a (Food) Waste to Biogas Project:

Two case studies from UW Oshkosh Biogas Systems

One case study from a new anaerobic digester-urban farm project in Chicago



ENERGY RESOURCES
CENTER

Technical Education and Analysis for Community Hauling and Anaerobic Digesters – TEACH AD

The goal of this program is to help communities and water resource recovery facilities in the Midwest region divert food waste from landfills by providing education and no-cost technical assistance to explore the increased adoption of anaerobic digestion and renewable energy biogas technologies.

- Educational Assistance
- Technical Assistance

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Webinar Speakers



Marcello Pibiri

UIC Energy Resources Center



Jason Feldman

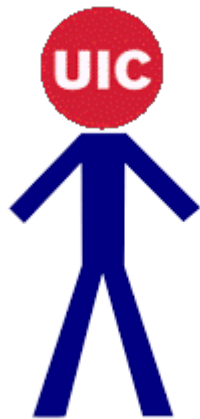
Green Era Sustainability



Brian Langolf, M.S.

University of Wisconsin Oshkosh

Thanks to
our sponsor!



Q&A

Submit your questions to the host using the Q&A box in the upper right-hand corner

Survey

After the presentation you will receive a brief survey. We appreciate your feedback

Presentations

A recording of today's webinar will be posted on the TEACH AD webpage and you will be emailed a link by early next week

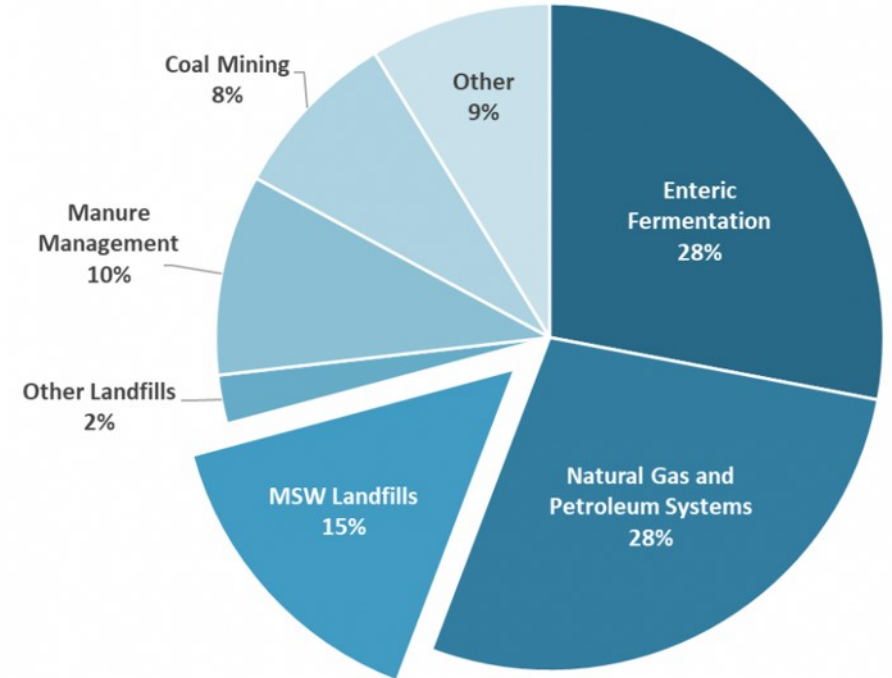
Technical Issues

Contact Sam Rinaldi at: samr@uic.edu or 312-996-2554 for assistance

Importance of diverting food waste from landfills

- Municipal solid waste (MSW) landfills are the third-largest source of human-related methane emissions in the United States
- By reducing the amount of food waste landfilled, we reduce methane emissions

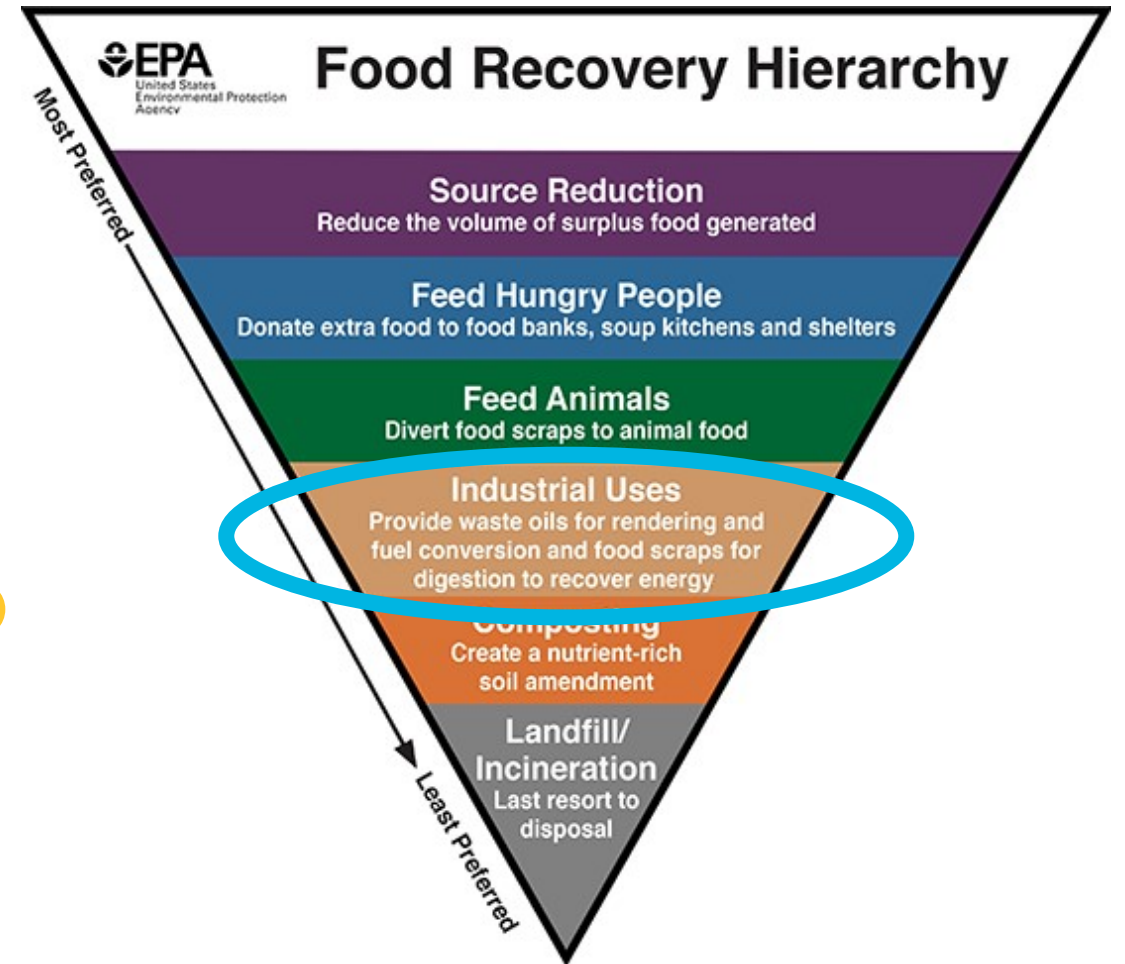
2018 U.S. Methane Emissions, By Source



Note: All emission estimates from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018*. U.S. EPA. 2020.

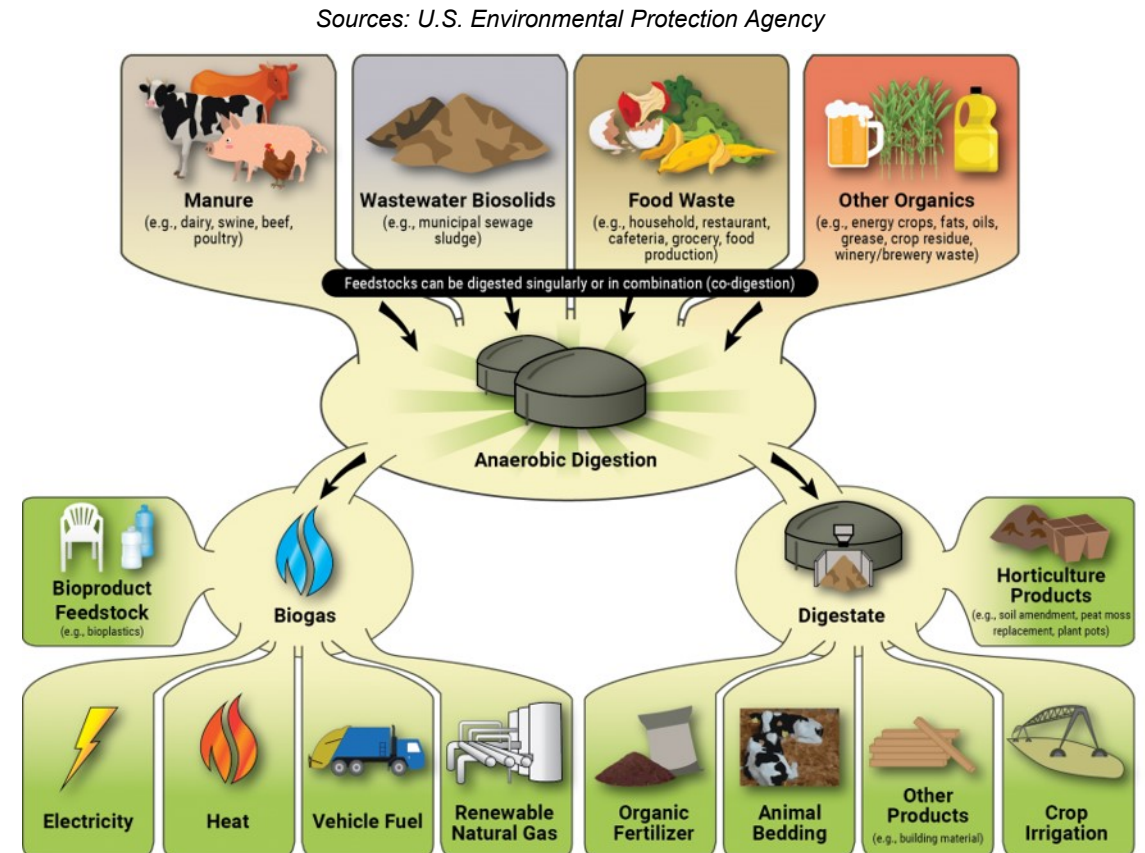
Importance of diverting food waste from landfills

- One-third of all food produced for human consumption worldwide is lost or wasted
- Source Reduction
- Feed People, Not Landfills
- Industrial Uses
 - **Anaerobic digestion**



Overview of anaerobic digesters

- Anaerobic digestion is the natural process in which microorganisms break down organic materials in the absence of oxygen.
- Two valuable outputs
 - Biogas
 - Digestate



Health Justice
Composting
Urban Farming
Renewable Energy
Resource Recovery
Energy Efficiency
Education
Food Recovery
Biosolids
Anaerobic Digestion
Sustainability
RNG
Zero Waste
On-Farm Digester
Food Access
Fertilizer
Water Resource Recovery
Nutrients Recovery
Climate Justice
Community Engagement
Clean Water
Green Jobs
Research
R-CNG
Biogas
Net Zero
Recycling
Digestate
Stand-Alone Digester
Clean Energy
Technology
Circular Economy
Closed Loop



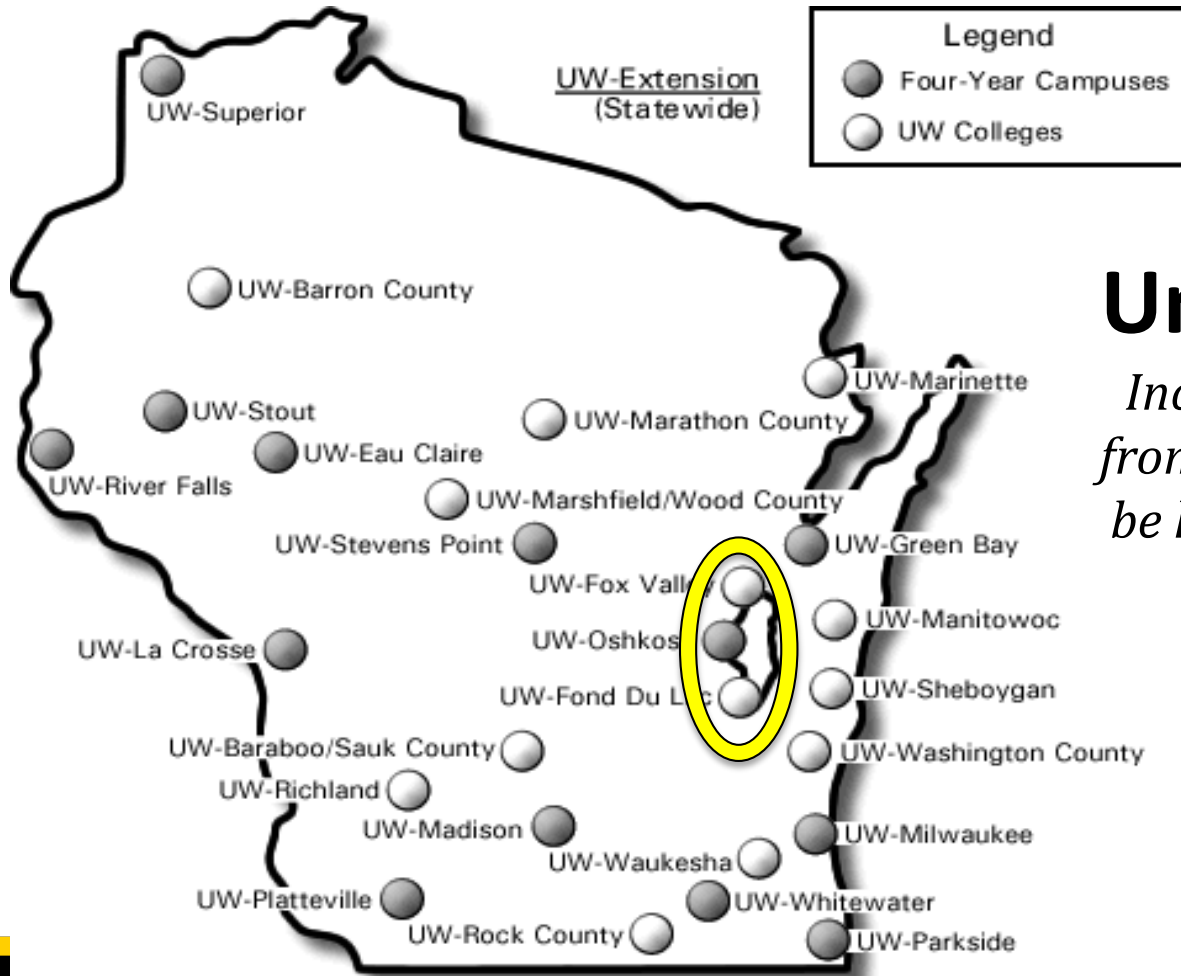
TEACH AD Webinar Series:
Food Waste to Biogas

The UW-Oshkosh Biogas Program

Brian M. Langolf, M.S.
Biogas Program Director



University of Wisconsin-Oshkosh

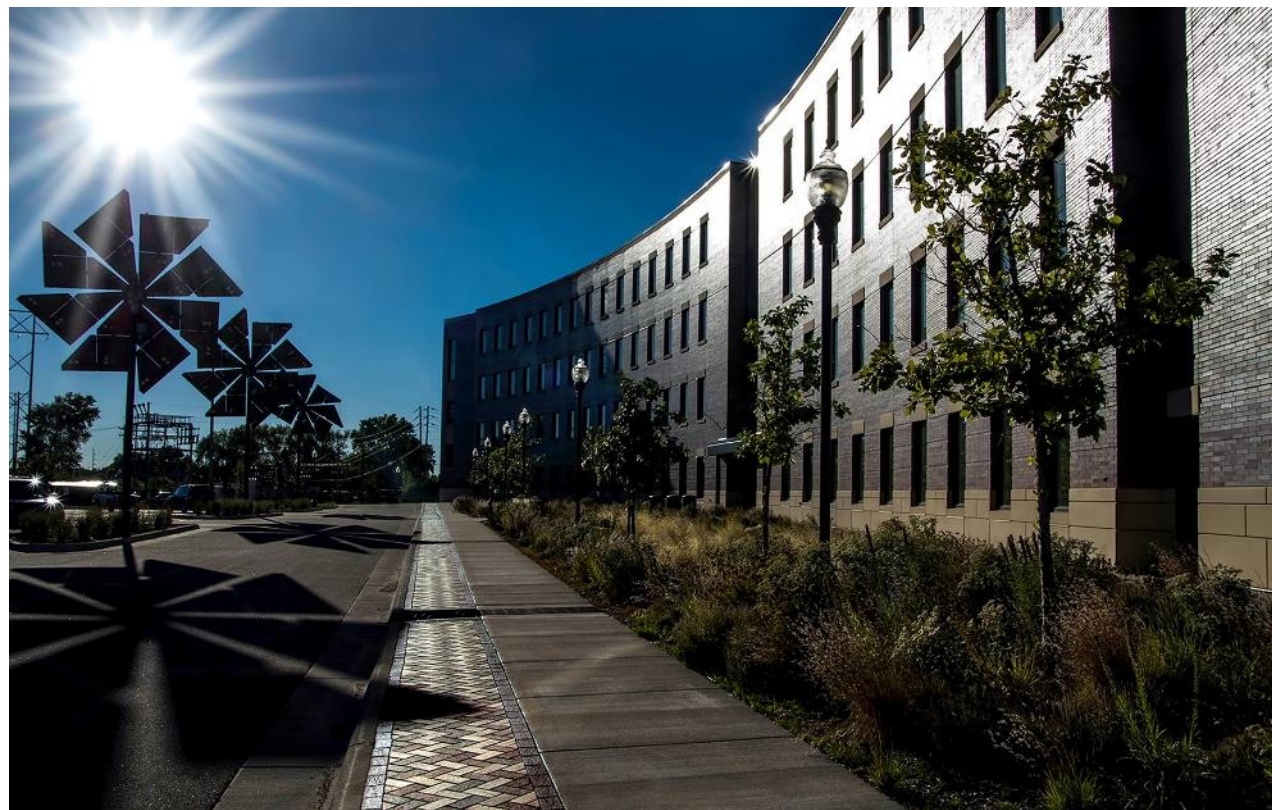


University goal:

Increase the use of energy from renewable sources and be leaders in sustainability.

UW Oshkosh — No. 3 Greenest School in the U.S.

—Sierra Club Magazine 2015



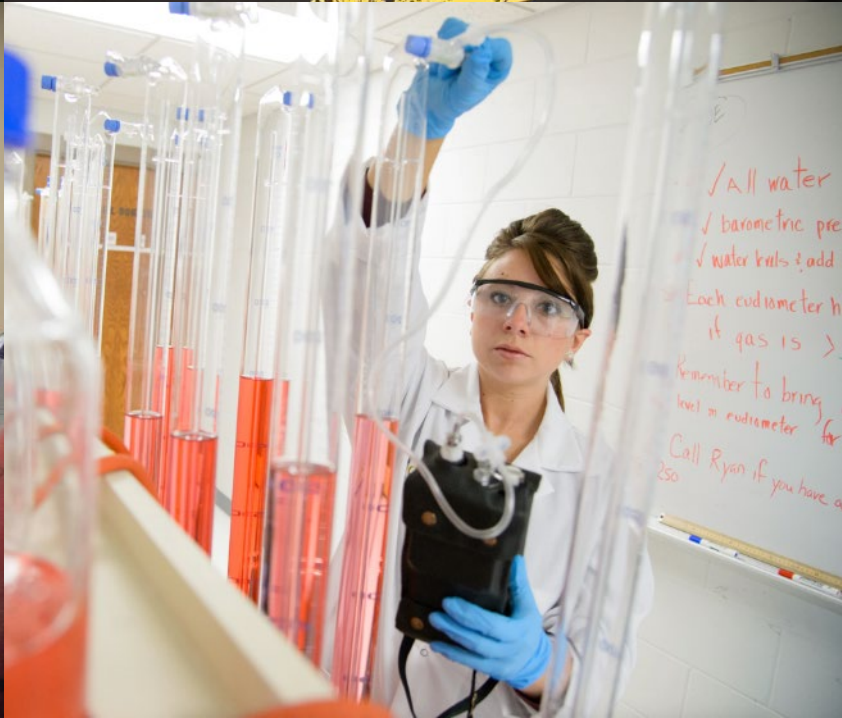
UW Oshkosh Biogas Systems

Urban Dry Digester

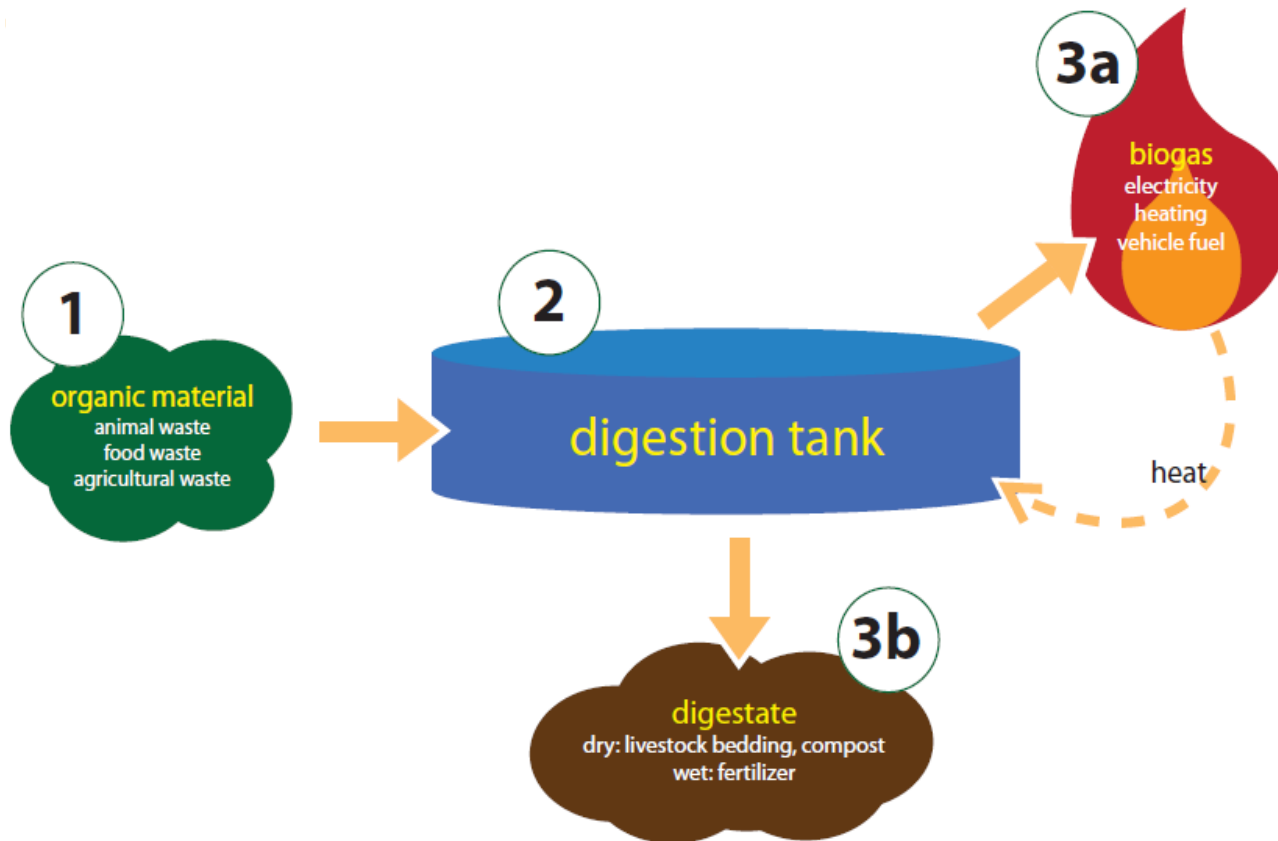


Allen Farms Digester





Biogas Systems The Basics





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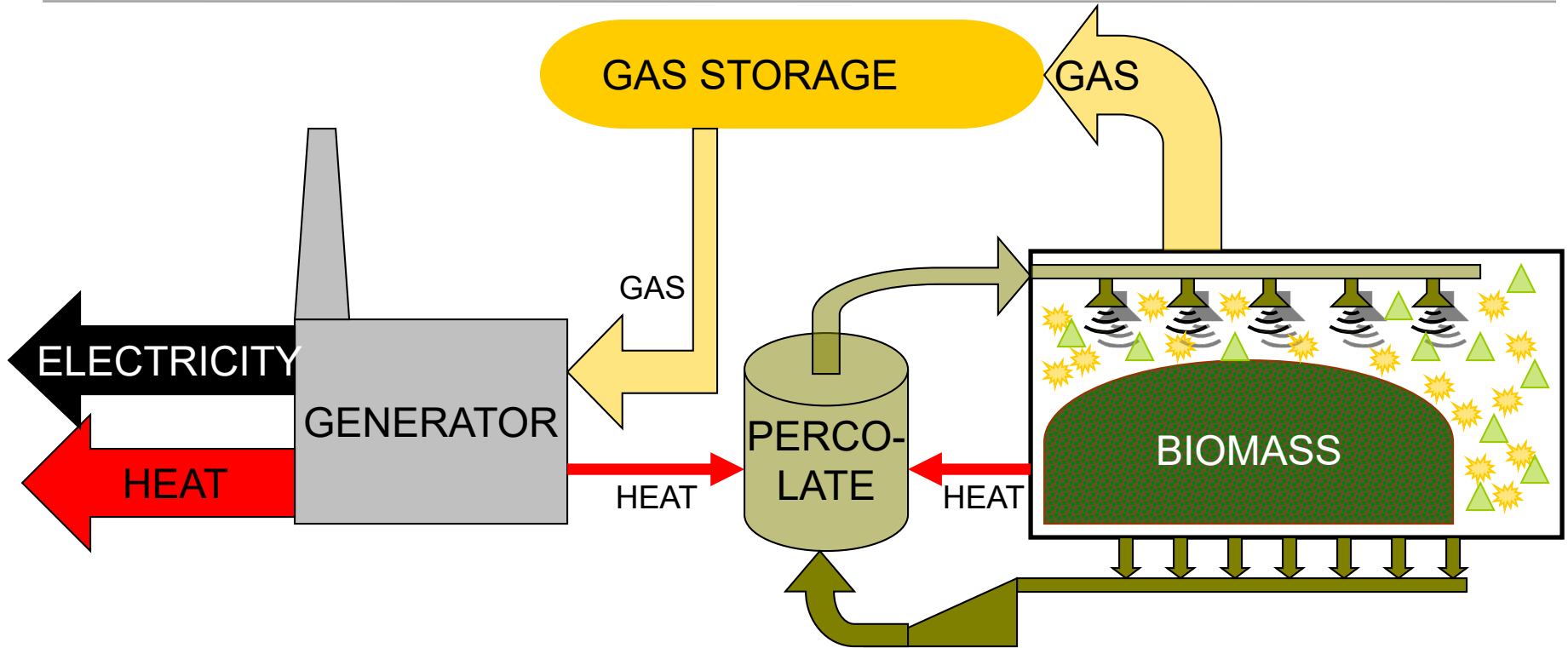
Biogas Program

Urban Dry Digester at UW-Oshkosh



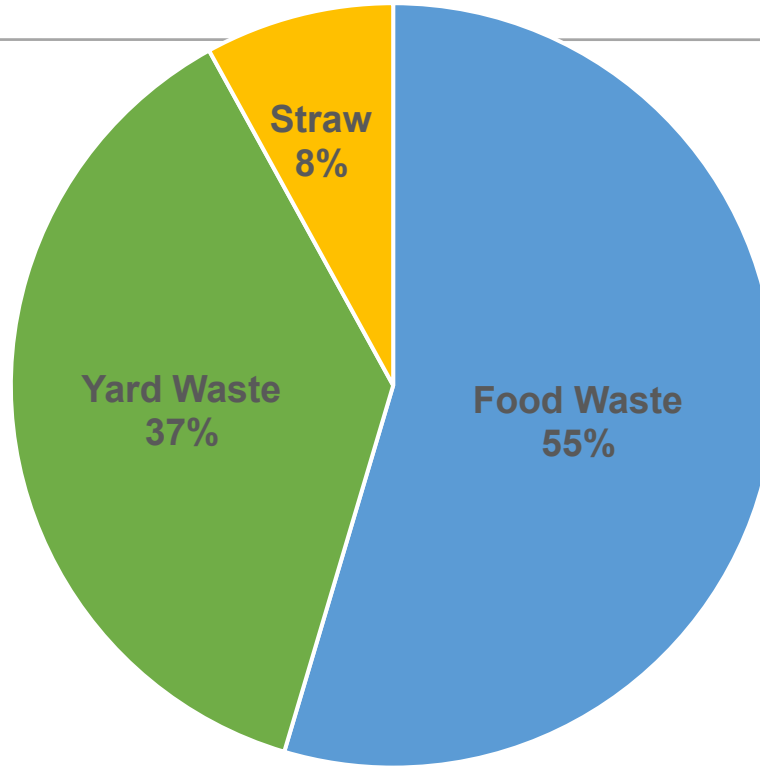
150
1871-2021
100
YEARS

How it Works



Solid “digestate” → aerobic composter site

Feedstock Recipe



■ Food Waste ■ Yard Waste ■ Straw

Annual Organic Material Processed = 10,000 tons per year



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Biogas Program

Campus Organics Collection Program



Feedstock



Making Compost



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Allen Farms

Resource Recovery and
Renewable Energy System

BIOFERM
BIOMETHANE
WILMANN Group

WISCONSIN
SEO
STATE ENERGY OFFICE

focus on energy
Partnering with Wisconsin utilities

VIESSMANN
climate of innovation



Free Stall Barn & Robotic Milking



Free Stall Barn & Robotic Milking



Manure Collection and Transfer to the Digester (liquid feeding)

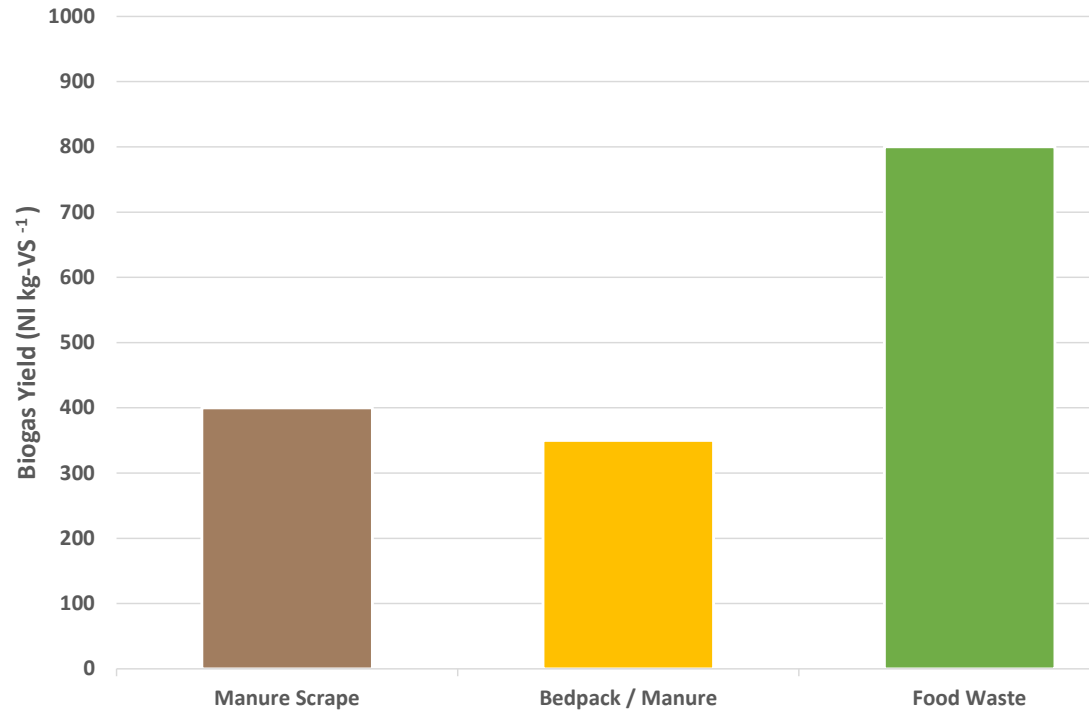
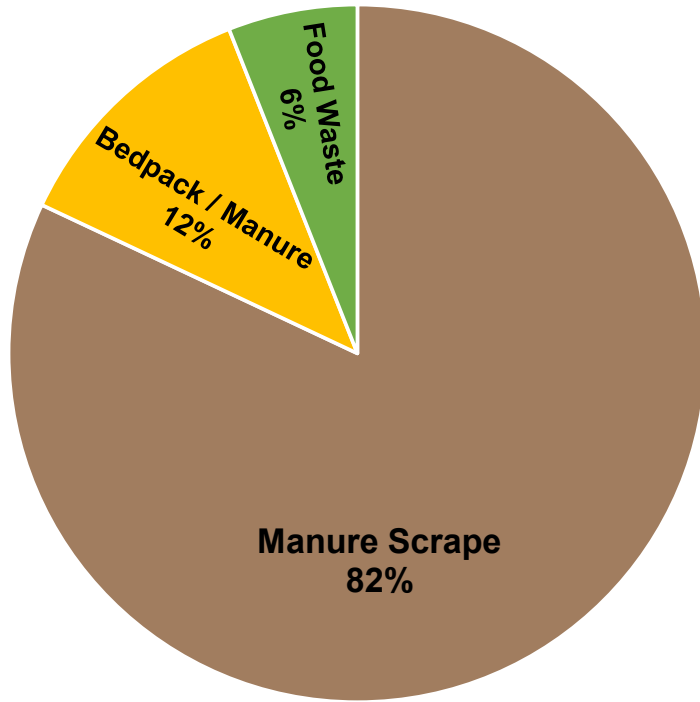


Bedpack and Food Waste (solid feeding)



Feedstock Recipe and BMP Value

Biogas Program



■ Manure Scrape ■ Bedpack / Manure ■ Food Waste

Annual Organic Material Processed = 6,600 tons per year

Digester Equipment



Mixing Inside the Fermenter





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Biogas Program

Combined Heat and Power





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Biogas Program

Land Application of Digestate



Challenges to AD

- What value can you get for the biogas
 - kWh vs. RNG, D3 vs D5 RINs
- High O&M Costs
- Need for multiple revenue streams
 - Biogas, tipping fees, digestate
- Feedstock stability, inhibition, laboratory testing
- Transportation Costs
- Trained Operators – Understanding of mechanics and the biology/chemistry

AD Benefits Beyond Electricity

- Alternative biogas uses
 - RNG, H₂, Liquid Fuels, Biopolymers
- Development of value-added end products
 - Soil amendments and Compost
 - Fertilizers
 - Animal bedding
- Water reuse and protection
- Odor reduction

Thank You



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MAKING COMPOST

the Titan Gold™ way

step 1: collect local organics



food, farm and yard waste
from local public and private sources are
diverted to our digester

step 2: use as renewable resource



heat and compost are created
up to 10% of compost energy
from local organic compost
compost to community



PREMIUM ORGANIC COMPOST

TEACH AD – Educational Assistance

- In person workshops (2)
 - Onsite events
 - Tour of the site
- Webinars (10)
 - Will cover different aspects of an anaerobic digestion project
 - **Join us again on December for our 3rd Webinar**
- Project profiles (8)
 - Will highlight successful AD projects
 - **First project profile covering UW Oshkosh Urban Dry Digester**

TEACH AD – Technical Assistance

- Anaerobic Digestion Technical Assessments (20)
 - U.S. EPA’s Co-Digestion Economic Analysis Tool (CoEAT)
 - Initial economic and physical feasibility assessment for (co)digestion of organic wastes
 - Standardized 2-4 page letter report
 - **First technical assistance completed with a hemp processing business**



TEACH AD - Contact

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Questions & Answers



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Thank You