Technical Education and Analysis for Community Hauling and Anaerobic Digesters

(TEACH AD)

TEACH AD Webinar Series - February 23, 2022

Small-Scale Anaerobic Digestion Plants :

Featuring two Case Studies from the University of California San Diego and from Tusten, NY

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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

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Isabella Aureguy

Digester operator

UC San Diego

Jennifer Porter

Vice President & Sustainability Officer

Gershman, Brickner & Bratton Inc. (GBB)

Jan Allen

Chief Operating Officer

Impact Bioenergy

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Thanks to our sponsor!

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Q&A

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

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

Survey

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

Technical Issues

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

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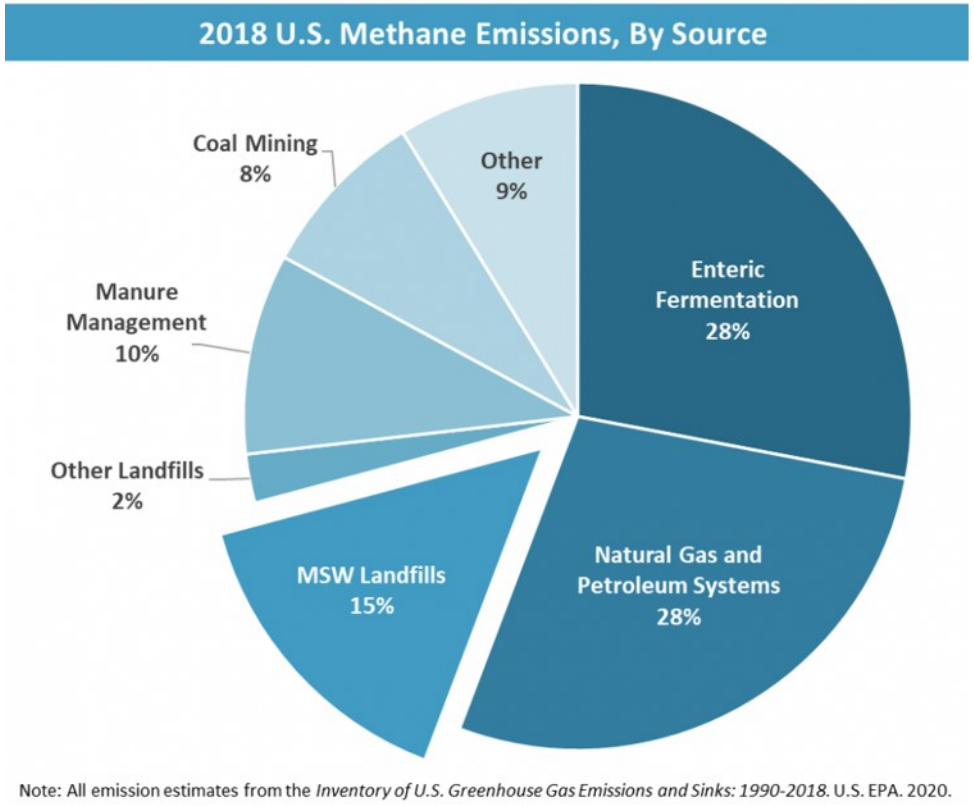
Importance of diverting food waste from landfills

- 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



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

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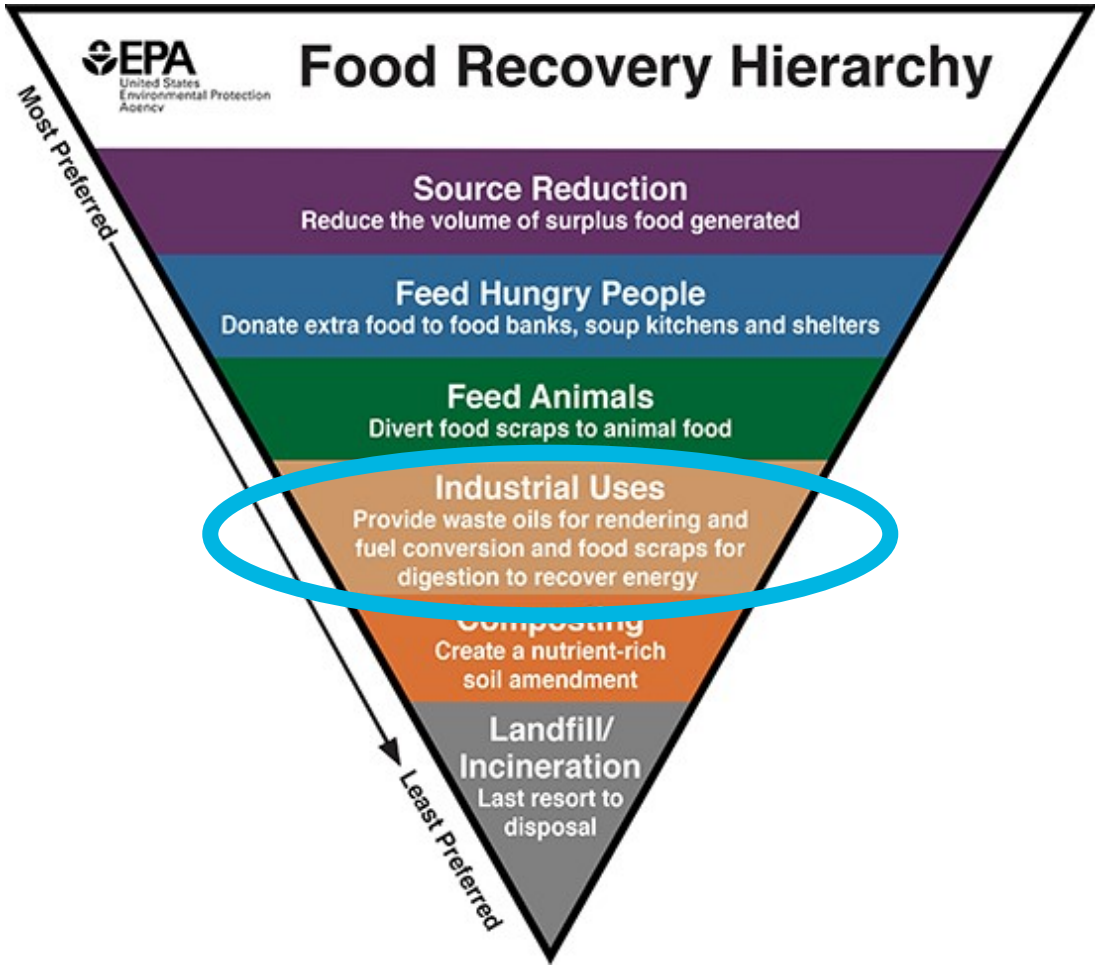
Importance of diverting food waste from landfills

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



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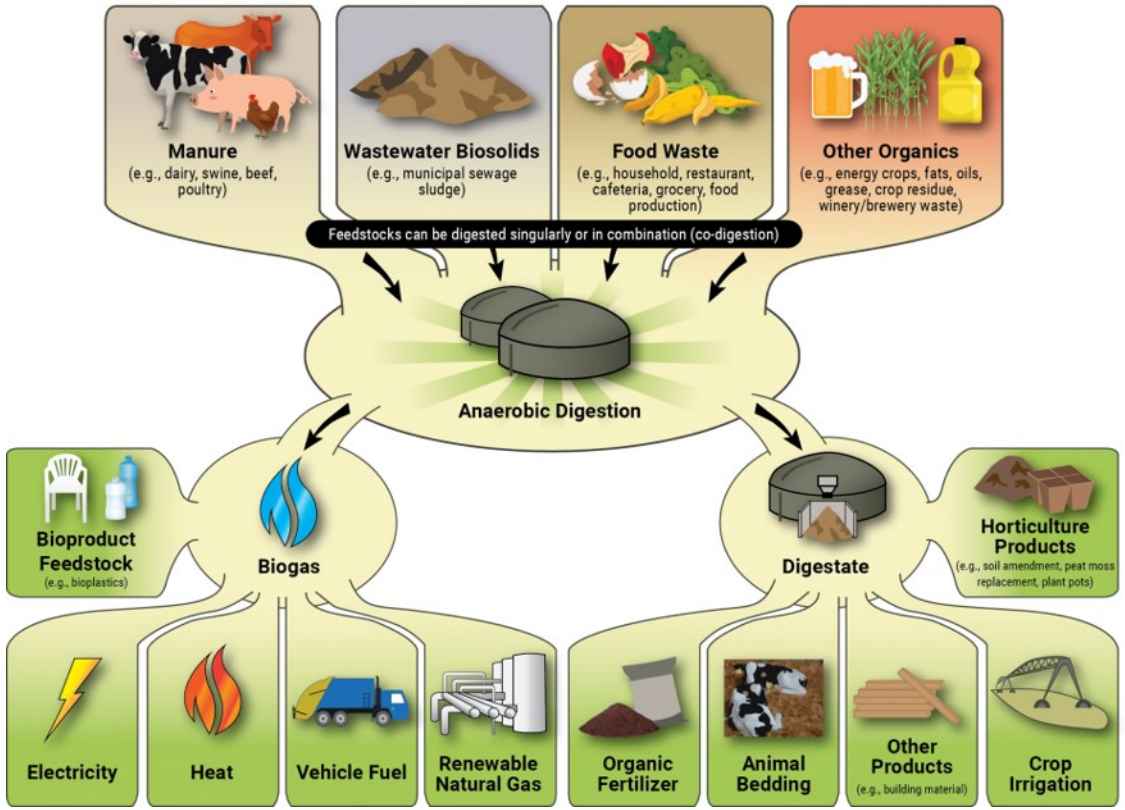
Overview of anaerobic digesters

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

Sources: U.S. Environmental Protection Agency



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Environmental Impacts of U.S. Food Waste:

What resources go into a year of food loss and waste in the U.S.?

*excluding impacts of waste management, such as landfill methane emissions

Greenhouse gas emissions of more than 42 coal-fired power plants

Enough water and energy to supply more than 50 million homes

The **amount of fertilizer** used in the U.S. to grow all plant-based foods for U.S. human consumption

An **area of agricultural land** equal to California and New York

Learn more: www.epa.gov/land-research/farm-kitchen-environmental-impacts-us-food-waste

Jan Allen

Impact Bioenergy

IMPACT® BIOENERGY

TOWN OF TUSTEN EST. 1853 NY AN UPPER DELAWARE RIVER COMMUNITY

UC San Diego

SMALL SCALE ANAEROBIC DIGESTION PLANTS

University of Illinois Chicago Energy Resources Center - February 23, 2022

Presentation Overview

- Background
- Landscape of Solutions (2 slides)
- Impact Bioenergy® Value Proposition (8 slides)
- Operating Projects (3 slides)
- Vashon Bioenergy Farm Model & Trials (4 slides)
- Vashon Bioenergy Farm Tour
- Conclusion and Q&A

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What We Will Cover

Anaerobic digestion of a small amount of organic and food waste was considered unprofitable a few years ago.

When talking about anaerobic digestion projects, large digesters are common but what does it take to scale down to community and campus-scale?

Universities, small towns and communities, farmers, and others are using this technology to reduce their carbon emissions, waste generation, and consumption of unhealthy food while creating new local jobs.

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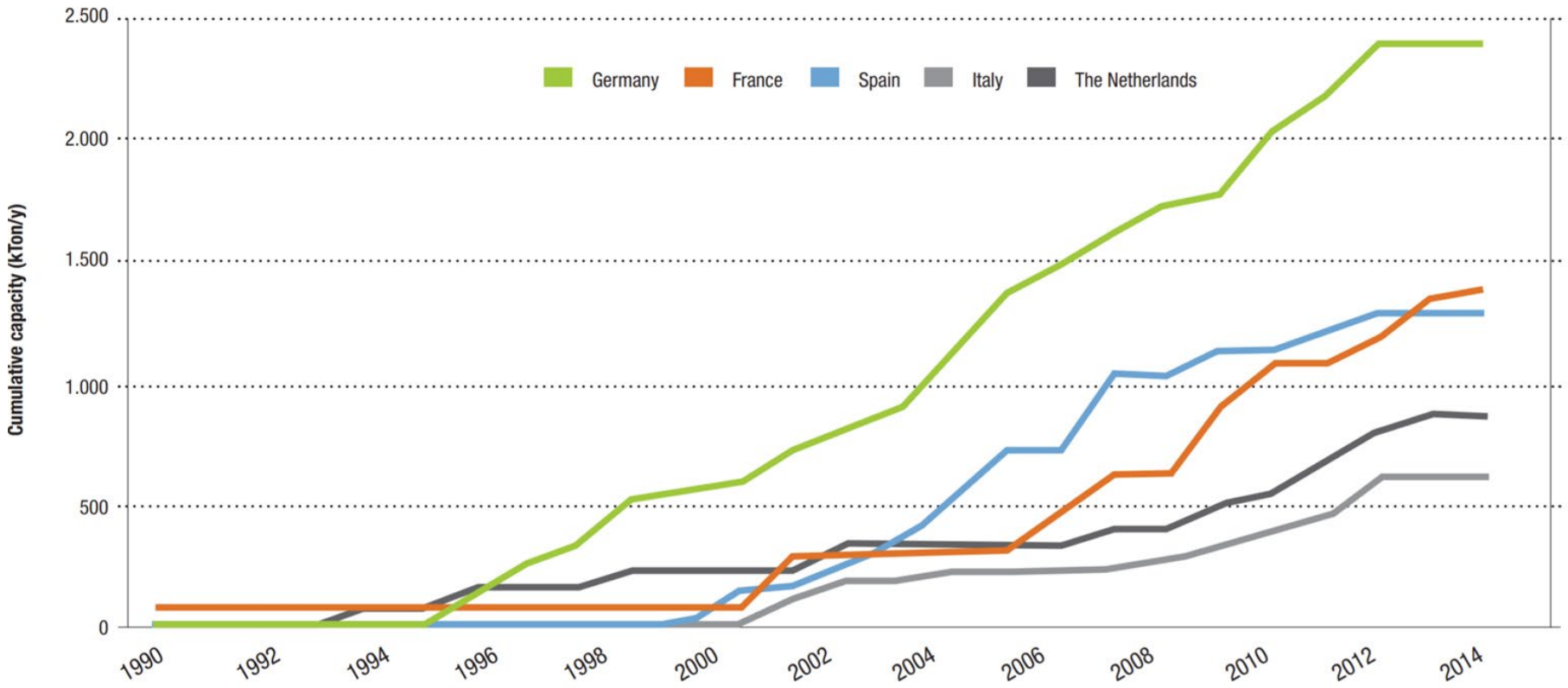
AD Global Universe

- Globally there are over 40 million AD systems in operation today. China, India, and Latin America lead in total number of systems and number of smaller, community-scale systems.

- There are over 20,000 larger, regional-scale systems in operation within the total. This give some indication of the large number of smaller systems operating today. The rest are community-scale, campus, or residential scale



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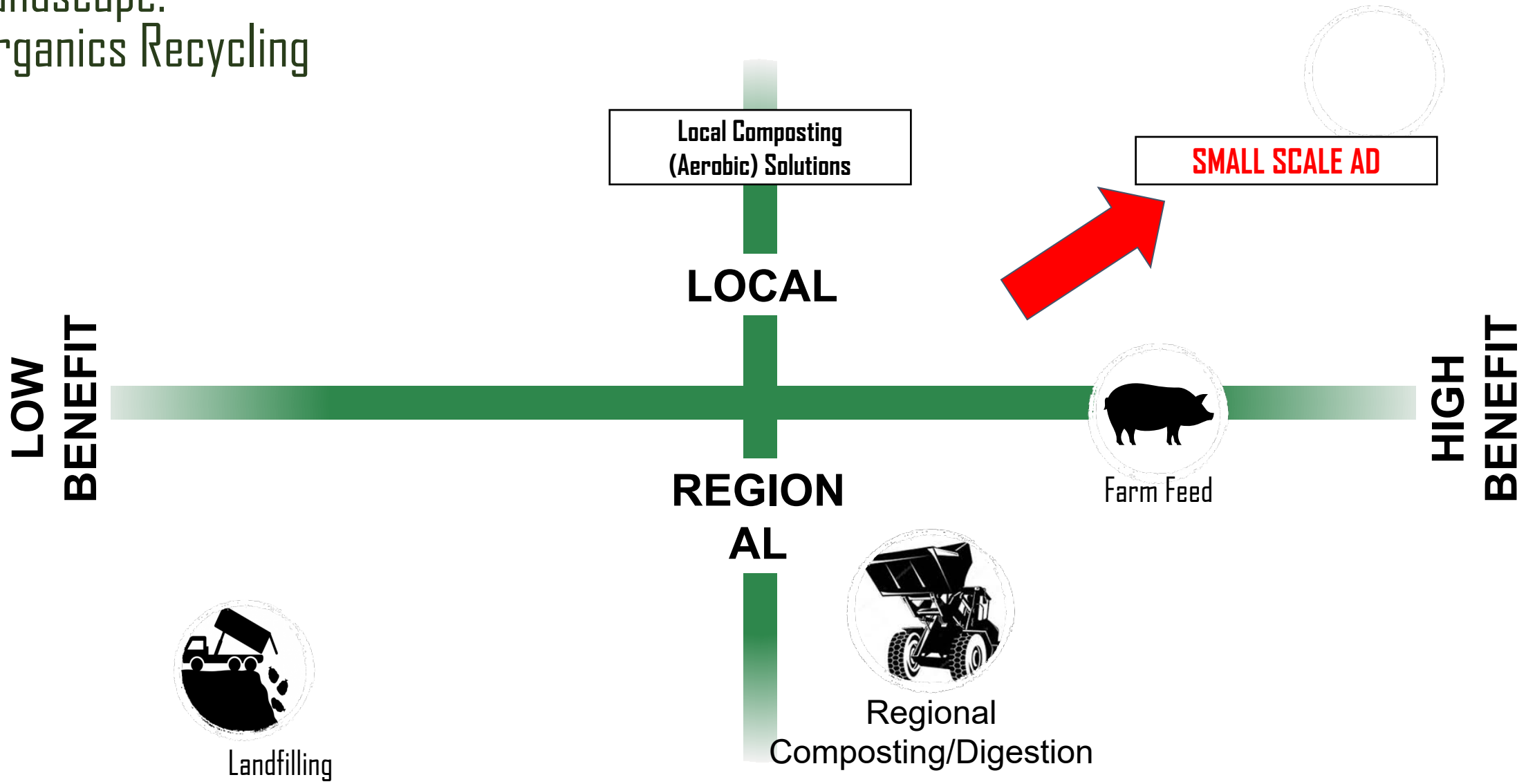
Landscape:
Organics Recycling



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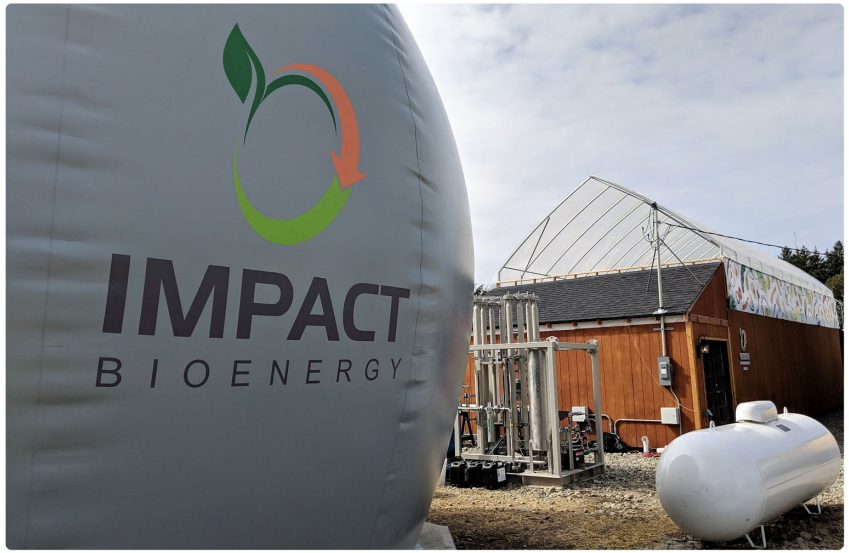
Value Proposition:
Convert "Waste" to Resources

40 gallons of
food waste
(~65 lbs.)



~1 gasoline gallon
equivalent (GGE) or ~7 kWh
clean energy

~7 gallons of organic
plant food
with zero-waste

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Small Scale Value Proposition

HORSE

135 lbs./day …….. 960 lbs./day – 1,000 lbs./day …….. 8,200 lbs./day

NAUTILUS

2x
per day
(135 lbs.)

Restaurants

Food Service/
Processors

Food Banks

Communities

Campuses &
Islands

3x
per day
(8,000 lbs.)

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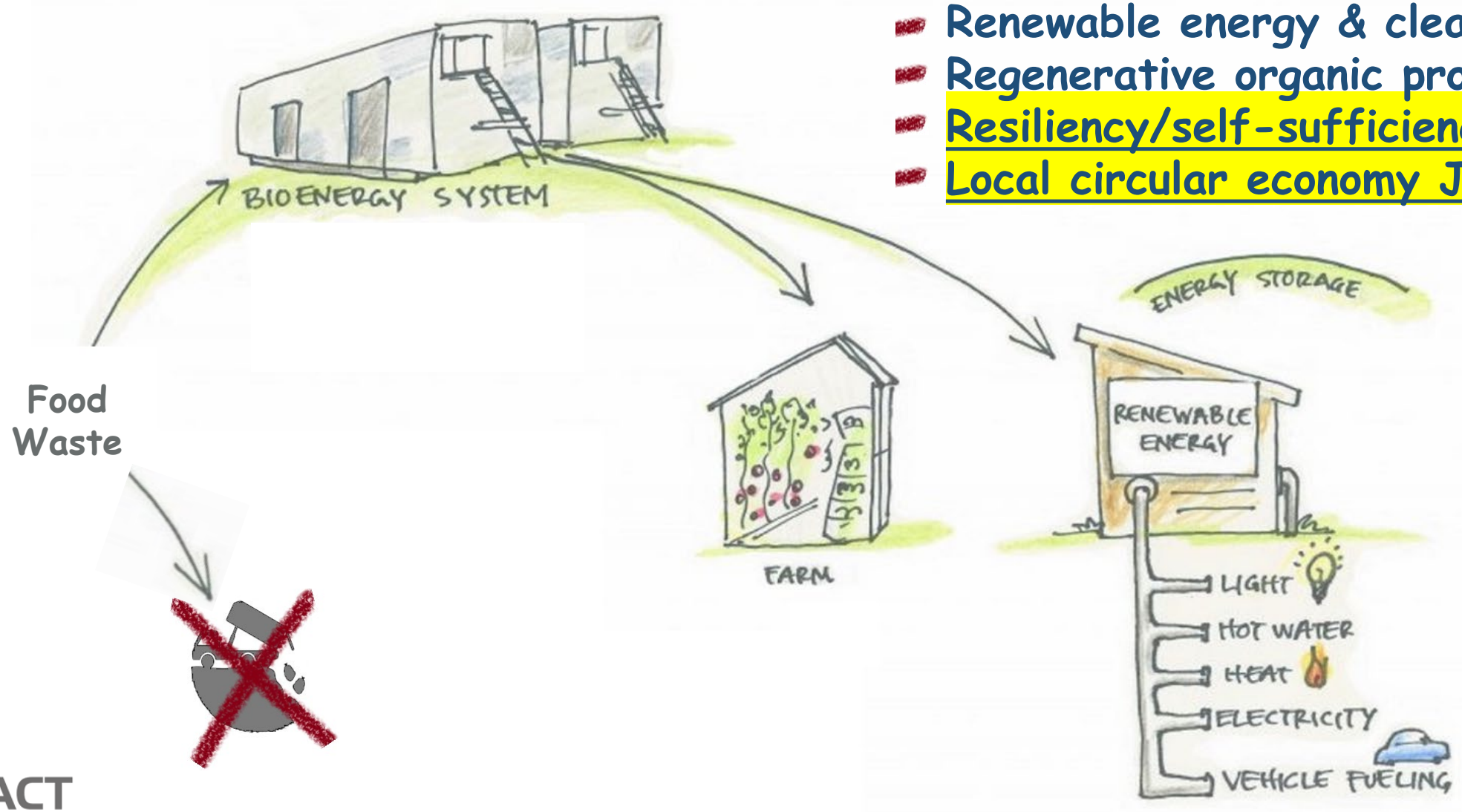
Distributed Scale Benefits

VASHON BIOENERGY FARM

- Zero waste
- Reduced transportation
- Renewable energy & clean fuel
- Regenerative organic products
- Resiliency/self-sufficiency
- Local circular economy JOBS



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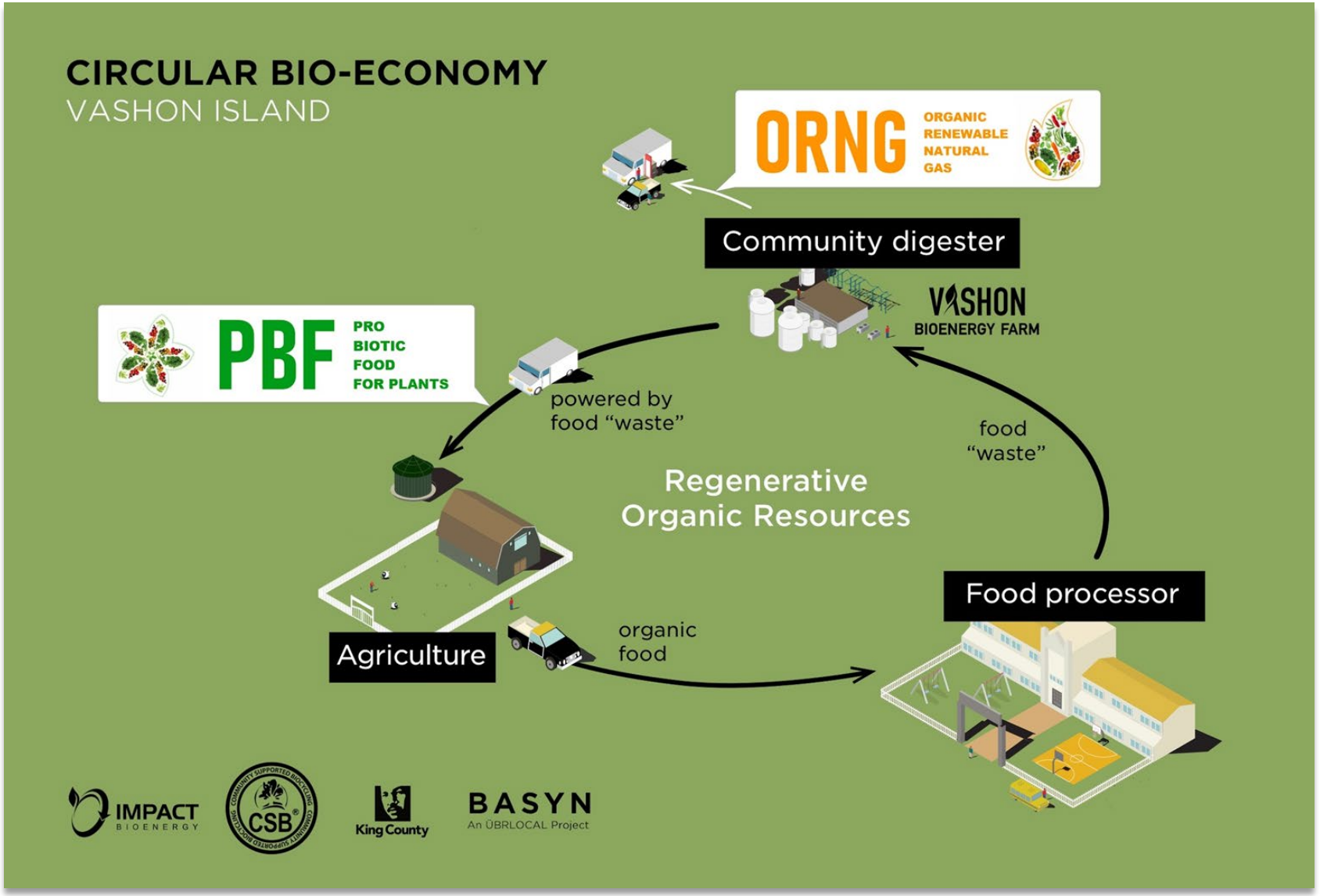
Circular Economy Model

VASHON BIOENERGY FARM



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Operating Projects: HORSE™ at Microsoft

In: **40 tons/yr organic waste from catering kitchen**

Out: **1,400 therms/yr of hot water, or 11,400 kWh/yr of electricity**

8,500 gal/yr of biofertilizer

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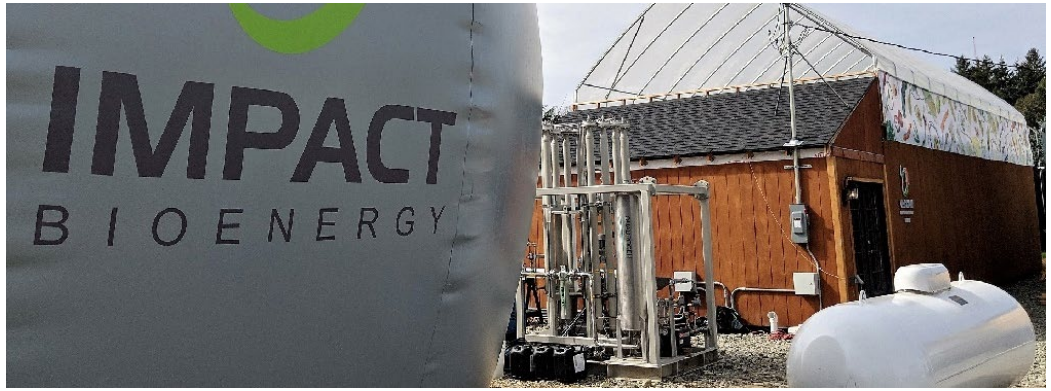
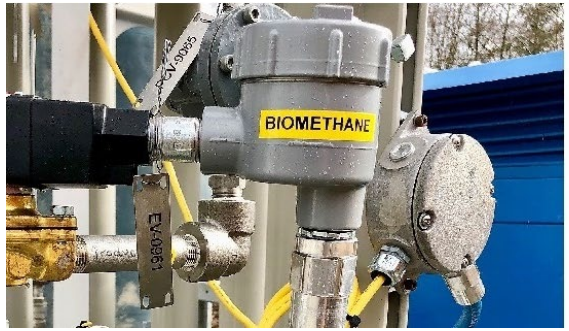
Operating Projects:
NAUTILUS™ at Vashon Bioenergy Farm, LLC

Max In: **1,500 tons/yr organic waste**
currently certified organic tofu SSO

Max Out: **120 GGE/day of RNG vehicle fuel**
960 gal/day of biofertilizer





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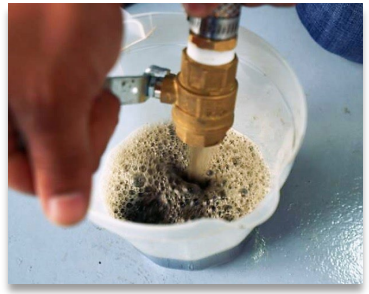
Vashon Bioenergy Farm: Trials Feeding the Food System



Ready to Use

Liquid, or

Dried

Now available on Amazon:PBF Dry Blend No. 7

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February 2022 Bok Choy Growth Trial

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Thank You

SMALL SCALE ANAEROBIC DIGESTION PLANTS

University of Illinois Chicago Energy Resources Center - February 23, 2022

Food Waste Diversion Initiatives and Mandates Case Studies of Tusten NY HORSE

TEACH AD Webinar Series: Small scale anaerobic Digestion Plants

February 23, 2022

GBB

Today's Presenter

I am passionate about working with communities now to advance a sustainable future for waste prevention, reuse and recycling.

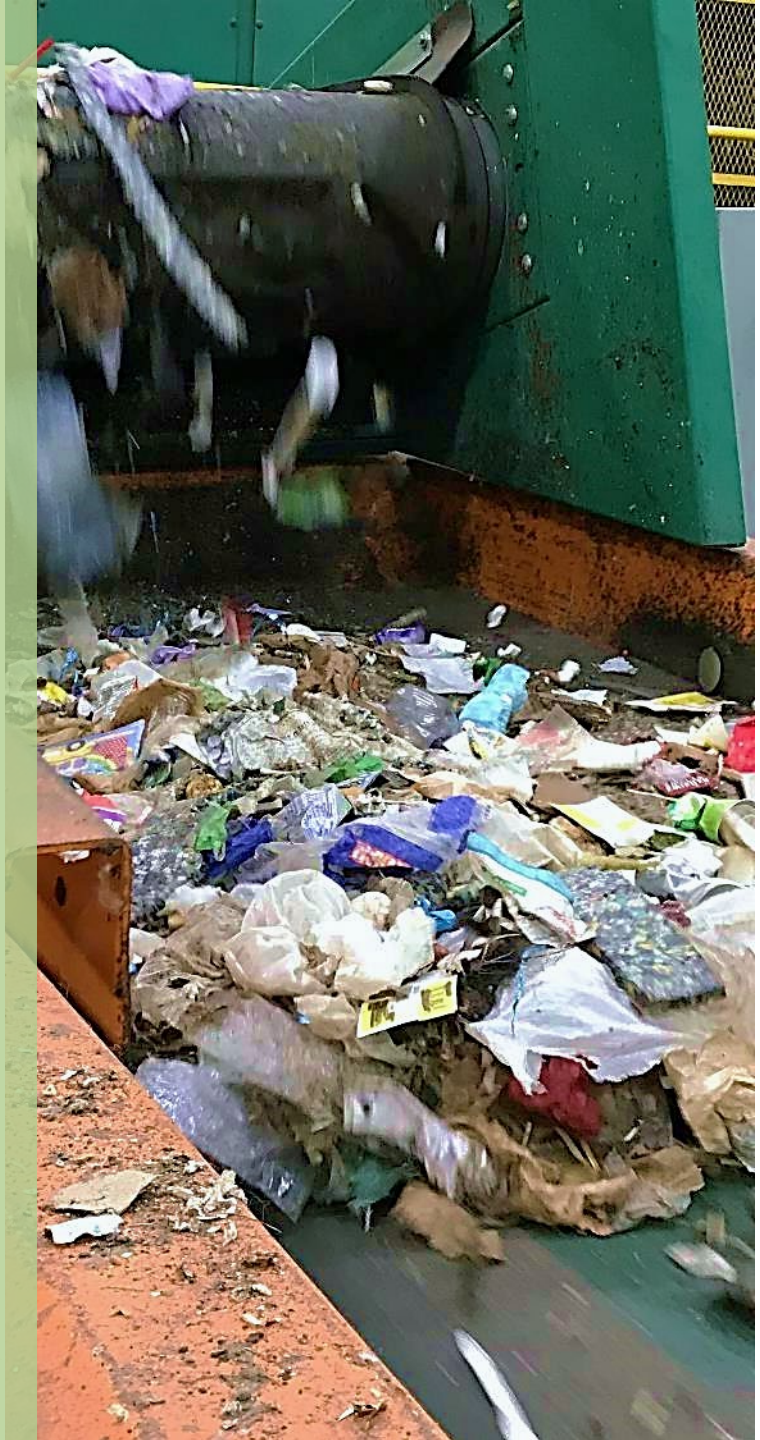
We have an urgent need to implement regenerative, circular solutions for ourselves and future generations.

Jennifer Porter

GBB Vice President – Sustainability Officer

SWANA / CRRA Certified Practitioner in Zero Waste Principles and Practices

Today's Agenda



Food Waste Initiatives and Mandates

15 minutes

GBB + the Circular Economy

Case Studies of Tusten NY HORSE

Questions & Answers

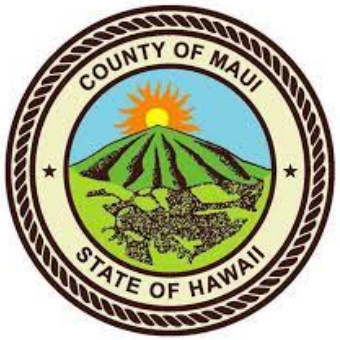
Our Story

GBB is an international solid waste management consulting firm that helps public- and private-sector organizations craft practical, customized and technically sound solutions for complex solid waste management challenges.

Since 1980, GBB has been a trusted resource at the forefront of the industry, creating success stories that integrate smart planning with effective management of solid waste services. Our staff enables our clients to do more with less.

Our Comprehensive Services

Some Key GBB Clients



NYS Food Donation and Food Scraps Recycling Law

- Effective January 2022, businesses that generate at least 104 tons of food waste per year, (calculated as annual avg of 2 tons wasted food/week), must donate excess edible food, and recycle all remaining food scraps.
- In New York State, food makes up 18% of all waste, about 3.9 million tons of wasted food from NY ends up in landfills each year.
- The law applies to large generators of food scraps such as restaurants, grocery stores, hotels & motels, colleges & universities, shopping malls and event centers in NYS, that are located within 25 miles of an organic recycler.
    - This law does not apply to NYC, as the City has already had commercial organics laws in place since 2012.

NYC Commercial Organics Requirements

- As of July 31, 2020: WARNING PERIOD EXTENDED FOR THESE BUSINESSES — NO FINES ISSUED UNTIL JULY 31, 2022
- **Food Service Establishments** (such as restaurants, delis, coffee shops, cafeterias, etc.)
  - Food Service Establishments having 7,000 to 14,999 square feet
  - Chain Food Service Establishments of 2 to 99 NYC locations with combined floor area 8,000 square feet or more
  - Food Service Establishments in Hotels having 100 to 149 guest rooms
  - Food Service Establishments with combined floor area 8,000 square feet or more in the same building or location
- **Retail Food Stores** (such as supermarkets and grocery stores)
  - Retail food Stores having 10,000 to 24,999 square feet
  - Chain Retail Food Stores of 3 or more NYC locations with combined floor area 10,000 square feet or more
- **Food Preparation Locations** having 6,000 square feet or more
- **Catering Establishments** hosting on-site events to be attended by more than 100 people
- **Temporary Public Events** to be attended by more than 500 people

Town of Tusten Energy Committee

Includes Narrowsburg: Unique hamlet along the Upper Delaware River in the Sullivan County Catskills

- *The TEC appointed in 2011to make sustainable changes to the beautiful Town of Tusten.*
  - Certified the 19th town in NYS a Climate Smart Community
- Stood behind Town of Tusten law banning fracking.
- Energy audits
- "TUSTEN RECYCLES" canvas bags
- Public space recycling stickers
- LED Streetlights
- Trex soft plastic collection – more than one ton collected = 5 benches!
- Tusten HORSE

Town of Tusten, NY

HORSE Microdigester, Model AD25 + Food Rescue Program

Funded by 2018 DEC Municipal Food Scraps Reduction, Food Donation and Food Scraps Recycling Programs

HORSE: High Solids Organic waste Recycling System with Electrical output

Reviewed Options with CET

- Objectives
  - Increase food rescue and food donation for the food insecure
  - Install HORSE Microdigester, Model AD25
  - Increase food waste diversion from businesses and residents
  - Train the Tusten Energy Committee for Year 2 + project maintenance

CET CENTER FOR ECOTECHNOLOGY
Wasted Food Solutions

GBB

The Heron Restaurant is in Narrowsburg, New York.
October 12 at 4:31 PM ·

#FeedingTheHorse Composter

High Solids
Organic Waste
Recycling
System with
Electrical Output

#theheronny #narrowsburg #narrowsburgny #sullivancatskills #upperdelaware #upstatenewyork #escapebrooklyn #upstater #saverestaurants #honesdale #hawleypa #callicoon #beachlakepa #horsecomposter

You, Lrac Retrop, Brandi Merolla and 53 others

6 Comments 3 Shares

Steps Ahead

1. Ramp up of food waste drop offs
2. Probiotic plant food marketing
3. Higher Ed/Community interest
    a. RIT case study underway
    b. SUNY Sullivan operating partnership
    c. NYS and PA towns planning visits

the laundrette

NARROWSBURG FARMERS' MARKET

Blue Fox MOTEL

THE HERON
★40 MAIN STREET NARROWSBURG, NY 12764★

botanist

Thank You!

Contact Us

Jennifer Porter

GBB Vice President

(347) 979-4992

jporter@gbbinc.com

Anaerobic Digester at UC San Diego

Isabella Aureguy

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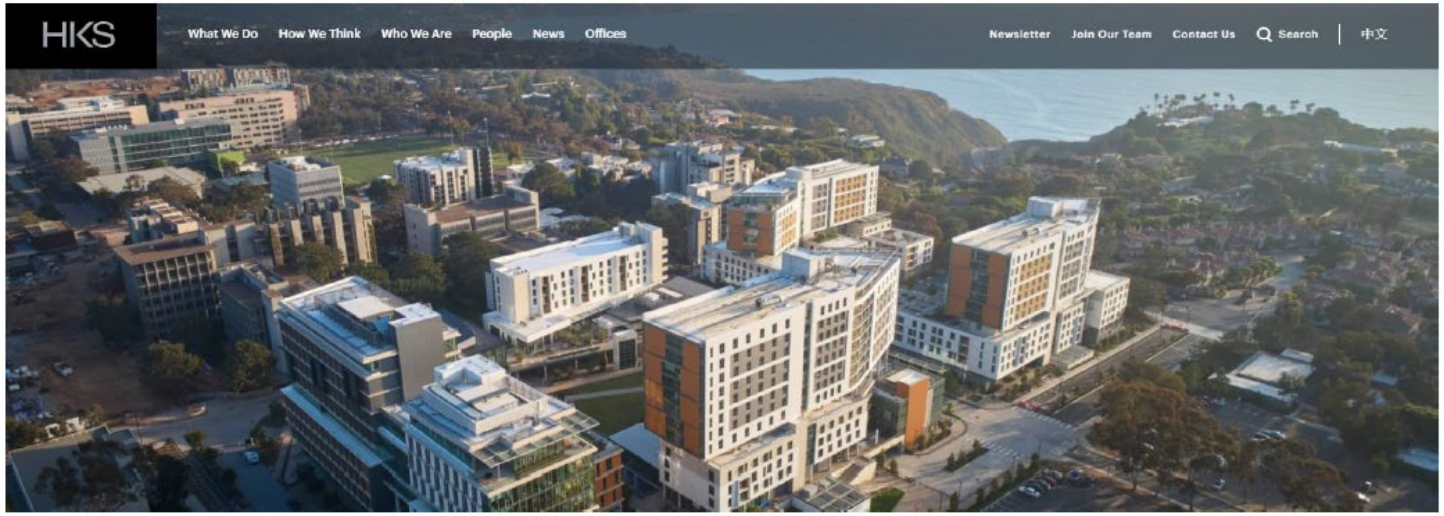
New Statewide Mandatory Organic Waste Collection

Beginning in 2022, SB 1383 requires every jurisdiction to provide organic waste collection services to all residents and businesses.

“Jurisdiction” means a city, county, a city and county, or a special district that provides solid waste collection services.

“Organic waste” includes food, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, paper products, printing and writing paper, manure, biosolids, digestate, and sludges.

New UCSD Campus - Design Objective



Case Study

UCSD North Torrey Pines Living and Learning Neighborhood New Living and Learning Neighborhood at UC San Diego Embodies Sustainable, Human-Centered Design

La Jolla, California

The Challenge

Human social dynamics, psychological needs and learning behaviors drove every design decision for NTPLLN. Weaving together living and learning in one place was a challenge, especially at the scale of this project, yet it formed the foundation for a vibrant, healthy and exciting community that also addresses the rising cost of housing in La Jolla, California.

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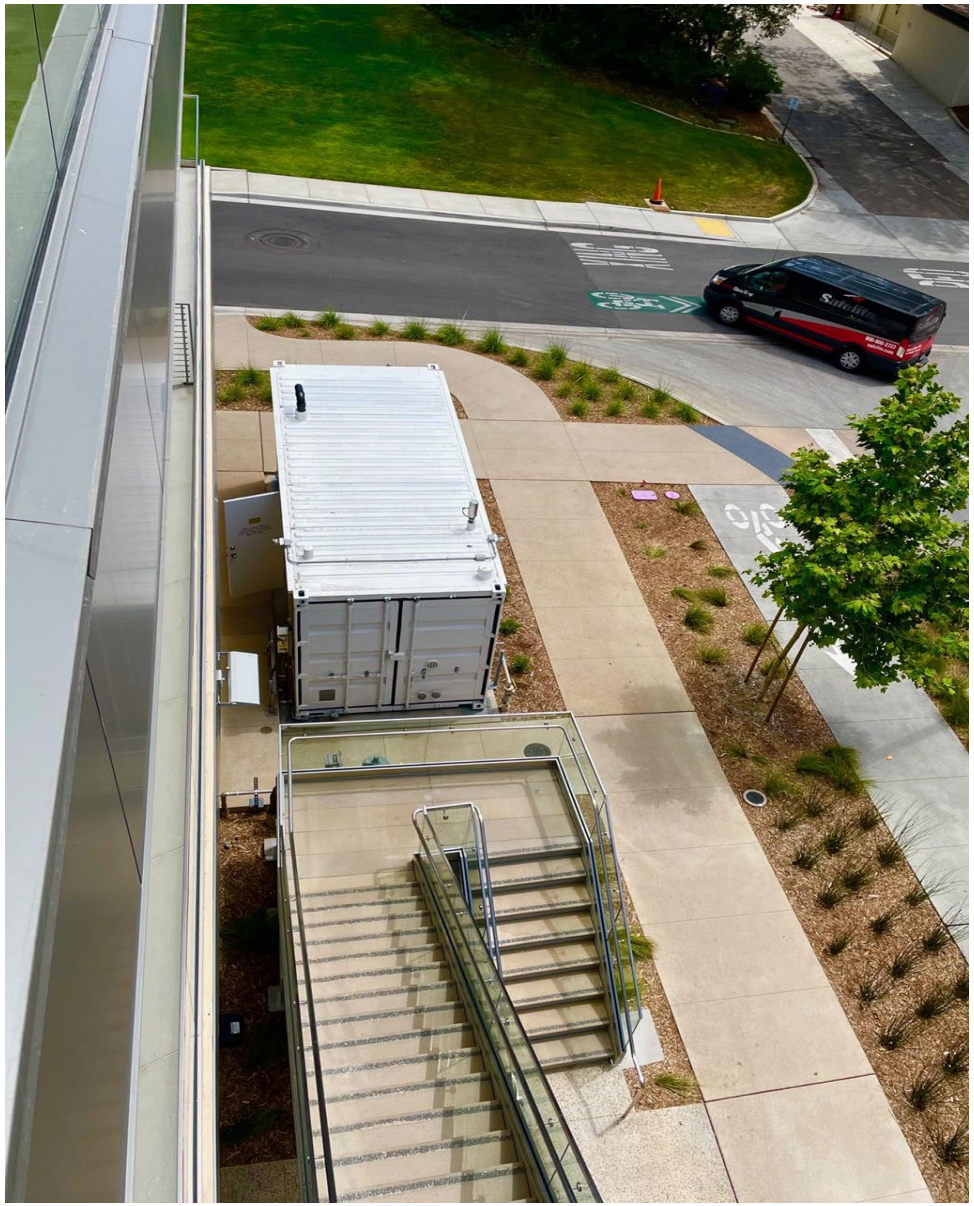

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July - December 2021

Input: 1331 pounds of food waste

Output:

- 419 gal of liquid plant food
- 741.00 cubic feet of biomethane
  - =1.75E7 BTU
  - =146 gallons of gasoline

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Our goal:

- divert **960 lbs** of food waste per week
- or **25 tons** per year
- This will conserve approximately **3.6 metric tons** of carbon dioxide equivalent annually
- **=405 gallons** of gasoline.

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Conclusion and Q&A

- 21st Century Circular Economy
- Small footprint
- Ease of use
- Odor & vector control
- Value-add products

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Thank You

Isabella Aureguy
iaureguy@ucsd.edu

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TEACH AD – Educational Assistance

- In person workshops (2)
  - Onsite events
  - Tour of the site
  - **Join us in April at the Kishwaukee Water Reclamation District for our first workshop**
  - **Visit erc.uic.edu/bioenergy/teachad/in-person-workshops/**
- Webinars (10)
  - Will cover different aspects of an anaerobic digestion project
  - **Join us again in May for our 5th Webinar**
  - **Visit erc.uic.edu/bioenergy/teachad/teach-ad-webinars/**
- Project profiles (8)
  - Will highlight successful AD projects
  - **First project profile covering UW Oshkosh Urban Dry Digester**
  - **Visit https://erc.uic.edu/bioenergy/teachad/project-profiles/**

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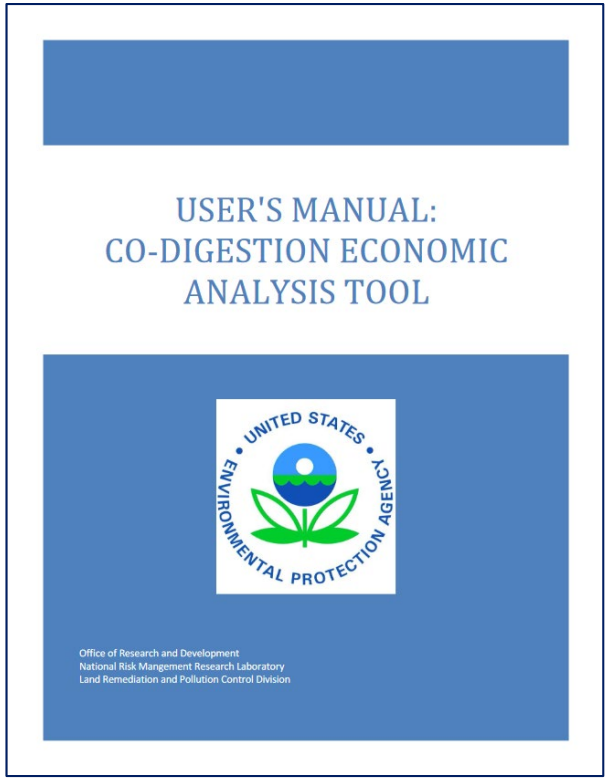
TEACH AD – Technical Assistance

- Anaerobic Digestion Technical Assessments
  - Tailored technical assistance to each client
  - Initial economic and physical feasibility assessment for (co)digestion of organic wastes
  - Assess opportunity for using U.S. EPA's Co-Digestion Economic Analysis Tool (CoEAT)
  - Report presentation and follow up with next steps

INITIAL DATA REQUEST → MEETING WITH THE SITE → REPORT PRESENTATION → FOLLOW UP



Visit erc.uic.edu/bioenergy/teachad/technical-assessments/

TEACH AD - Contact

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Questions & Answers

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TEACH AD Webinar Series and Workshops

Join us again in **May** for our **5th Webinar!**

Join us in **April** for our first in person **Workshop** at the **Kishwaukee Water Reclamation District**

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Thank You

Please fill out our survey.

A recording of today's webinar will be posted, and you will be emailed a link by early next week.

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Thank You

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