



RAMSEY/WASHINGTON
RECYCLING & ENERGY

Ramsey/Washington Recycling & Energy (R&E)

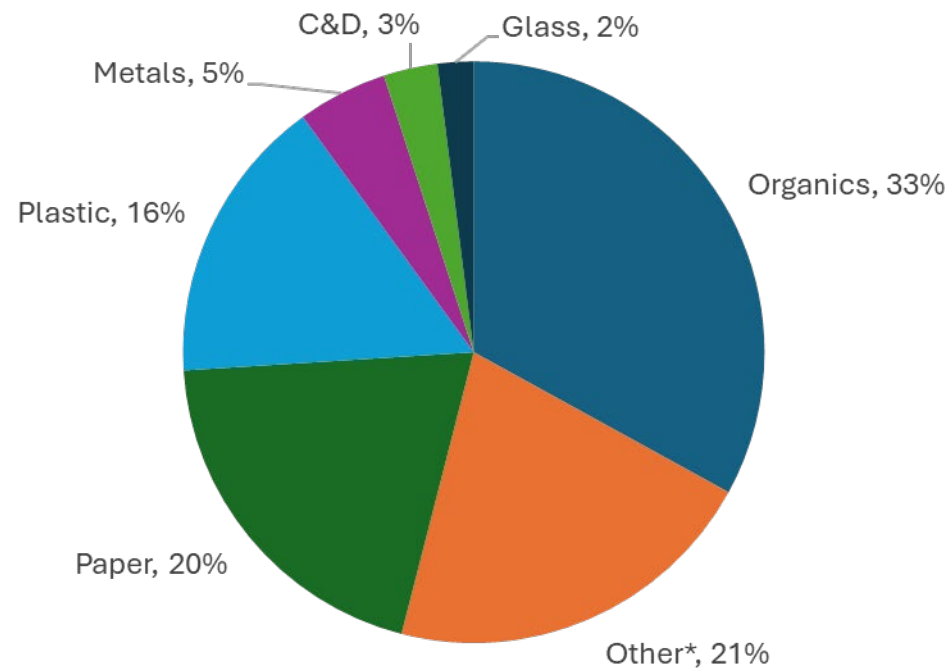
SWA 101-PFAS Mitigation

The R&E Center

- Located in Newport, MN
- Purchased by the two counties in 2016
- All trash from residents and businesses in the two counties delivered here
- Produces refuse-derived fuel (RDF) used by Xcel Energy Power Plants to generate electricity
- R&E Center manages nearly 14% of the state's total waste



What's in our trash?



R&E Waste Composition

(by weight, 2022 data)

33% Organics

21% Other*

20% Paper

16% Plastic

5% Metals

3% C&D

2% Glass

*Other includes, furniture and bulky items, textiles/clothing, carpet, appliances, and electronics



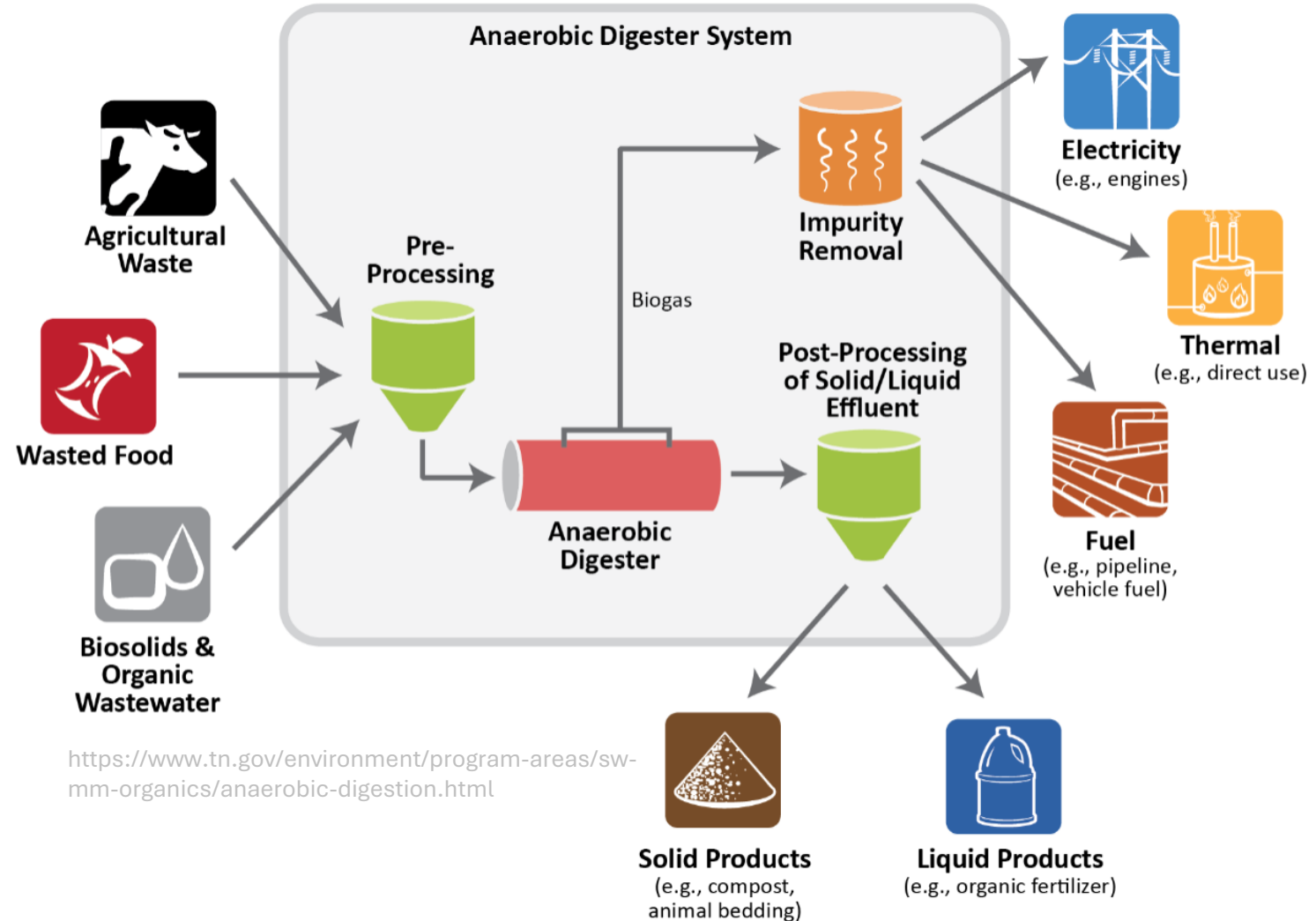
Problem:



<https://www.epa.gov/land-research/quantifying-methane-emissions-landfilled-fr>

Potential solution:

Anaerobic digestion (AD)





About the Food Scraps Pickup Program

Food Scraps
PICKUP
Program™

 RAMSEY COUNTY

Washington
County

Food Scrap Pickup Program

- Food scraps comprise over 20% of household trash by weight
- Food scraps can generate energy and compost instead of becoming waste
- Collecting food scraps will help reduce greenhouse gas emissions and meet state recycling goals

How It Works



Order your free supply of food scrap bags.



Collect your food scraps in the bags. Once a week or when the bag is full, tie a knot at the top to close the bag.



Place your bag inside your trash cart or dumpster for collection.



Done! The food scraps will be composted.



Food Scrap Bags

Design

Bags are specially designed to withstand the trip in garbage truck and then eventually break down with their contents.

Specifications

Thickness: 1.4 mil thick (about 3x thicker than a grocery store bag).

ASTM standards: compostability, strength, penetration resistance.

Compostability: BPI-certified.

Testing: bags tested in actual loads of trash.

Color: green with compostable ink.

Sizes

6-gallon and 13-gallon.

Households will get 60 bags per order (expected to last about one year).



Why Bags Instead of Separate Carts?

Environment

A food scrap bag system will result in a net decrease in greenhouse emissions, while a separate cart system results in a net increase in greenhouse gas emissions, largely due to the need for more collection trucks.

Efficiency

A separate cart system would cost approximately ten times as much as a food scrap bag system. A food scrap bag system efficiently uses existing collection routes, trucks and containers. (And you won't have extra trucks driving down your street!)

Equity

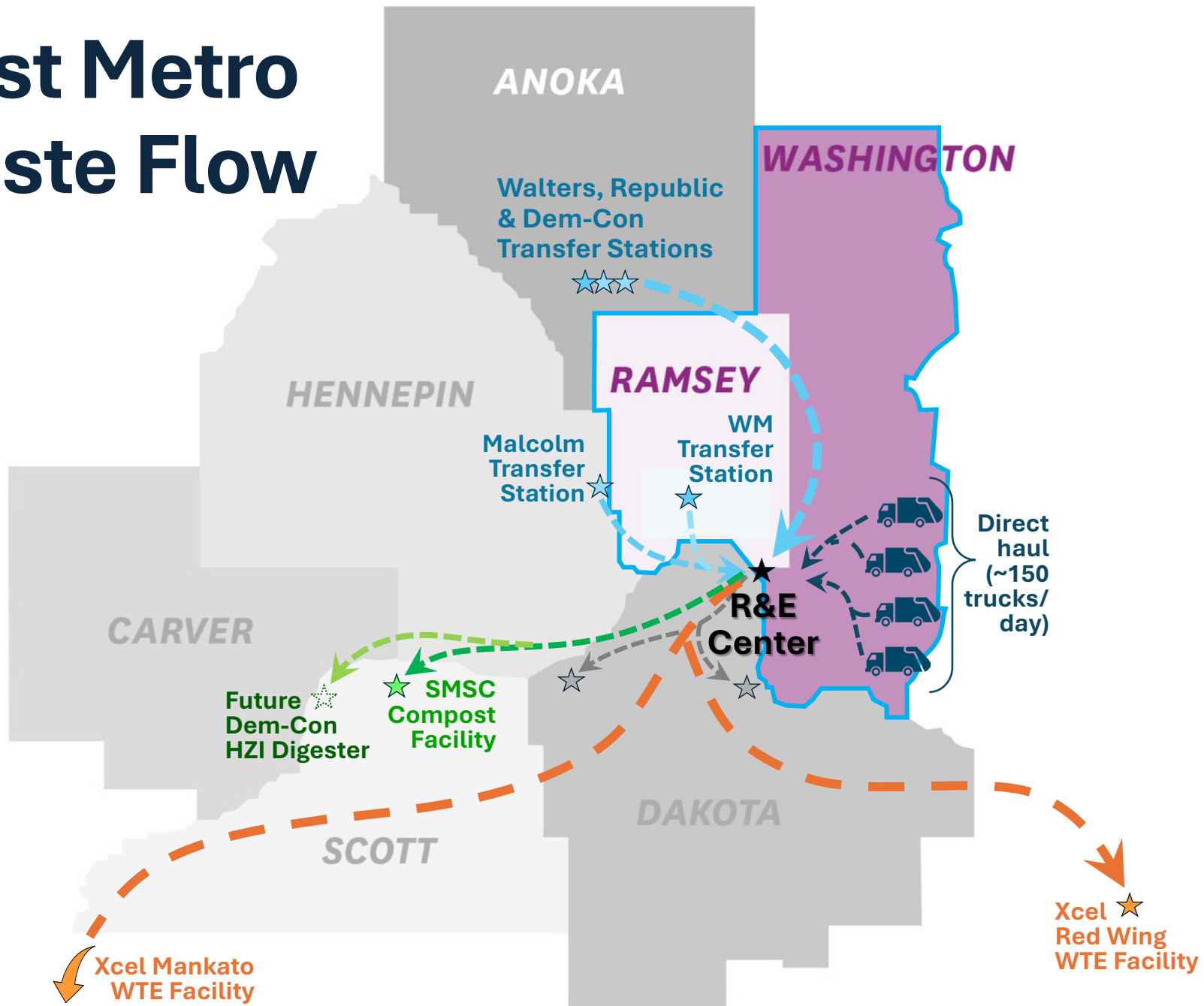
A food scrap bag system would allow more people to participate. All residents can participate for FREE, no matter what municipality they live in, which hauler they use, or what type of home they live in. Not all apartment buildings or condos have space for additional carts.

Where Do Food Scrap Bags Go?

- Food scrap bags are mechanically separated from trash at the R&E Center (and soon our transfer stations)
- From there, food scrap bags are delivered to compost facilities (and an anaerobic digestion facility in the future)



East Metro Waste Flow



Inbound waste flow

- Direct haul
- Transfer stations

Outbound waste flow

- Waste-to-energy
- Landfill
- Metals Recycling
- Industrial Compost
- (Future) AD

Industrial Composting

- Produces the same material backyard composting does – compost.
- Takes about 6 months.
- Accepts additional items like meat, bones, dairy, BPI-certified compostable products, and some non-recyclable paper products.
 - Pre-processing and consistent high temperatures allow for more materials.
- Local facilities.
 - The Mulch Store – Rosemount.
 - SMSC – Shakopee.
- Can purchase finished compost from local facilities.



Organic Waste Anaerobic Digester Shakopee, Minnesota

March 2024

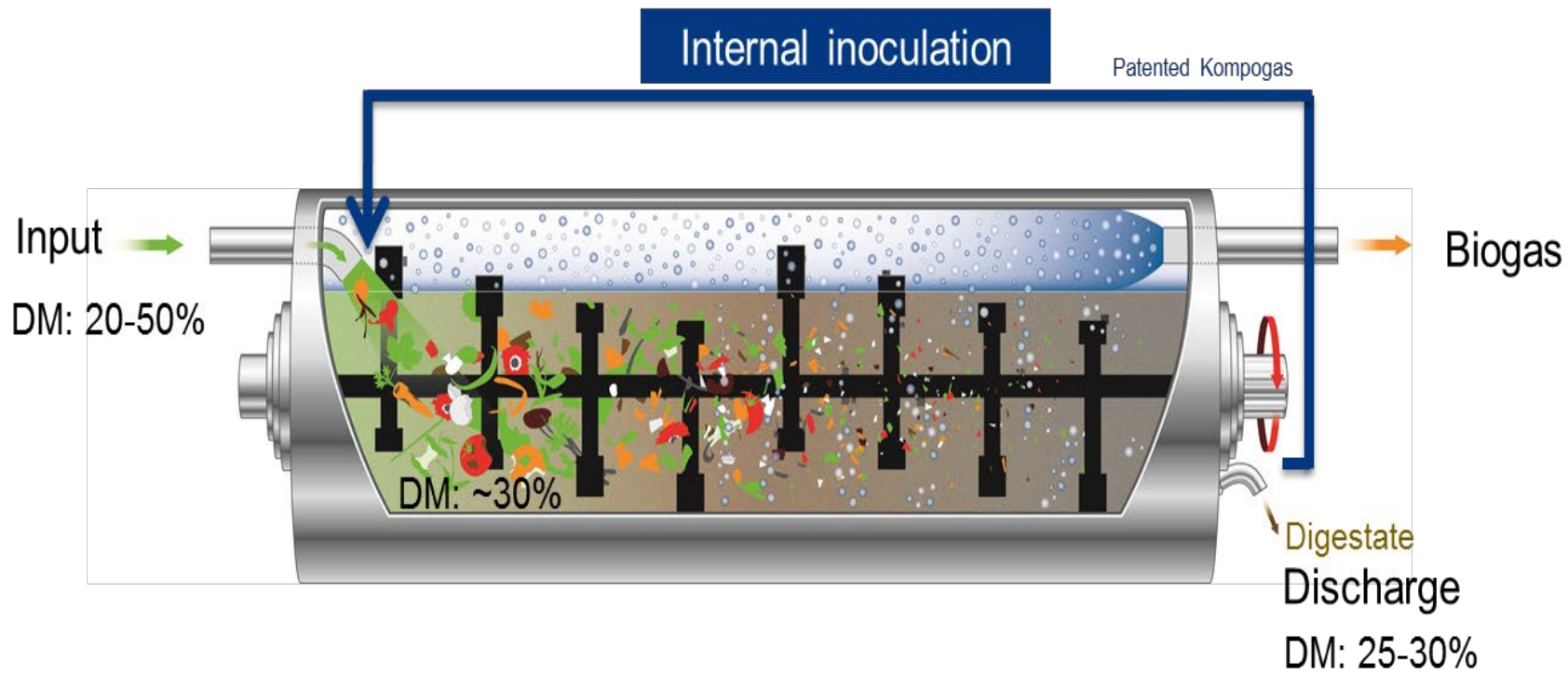


Kompogas® by



HZI Facility, Jonkoping, Sweden





**Horizontal
plug flow**

- Optimal digestion -

**Thermophile
temperature 131° F**

- Biological activity -

**Longitudinal
agitator**

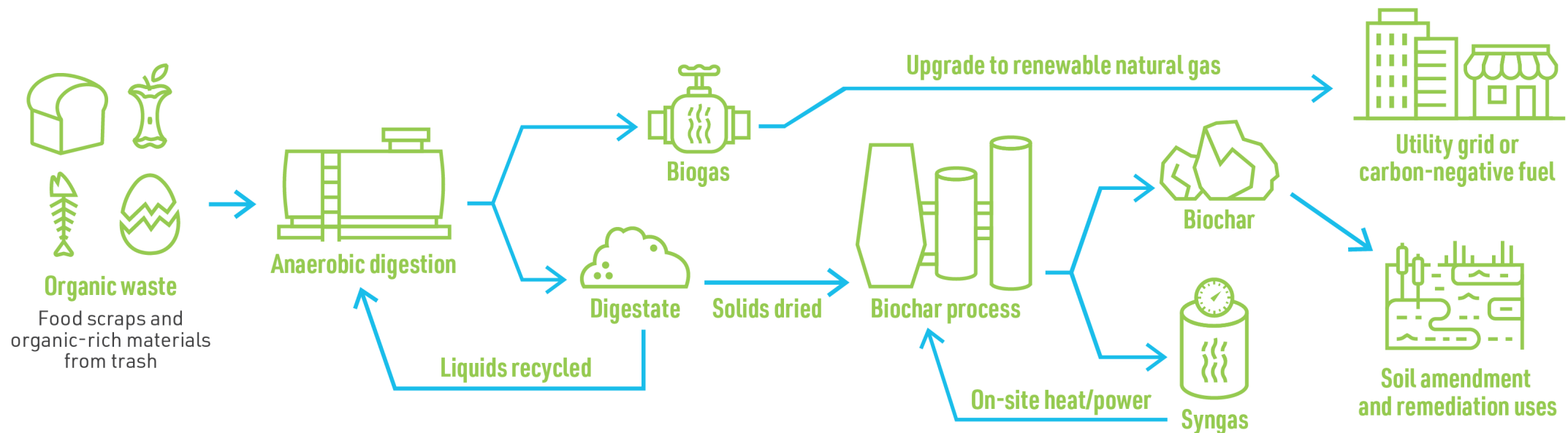
- Energy saving & tight -

Internal inoculation

- Stable & quick process -

Anaerobic Digestion At-A-Glance

A process in which biodegradable (i.e., organic) material is placed into a container deprived of air. Microorganisms break down the organic material and produce **biogas** and **digestate**.



Process Steps and Plant Components

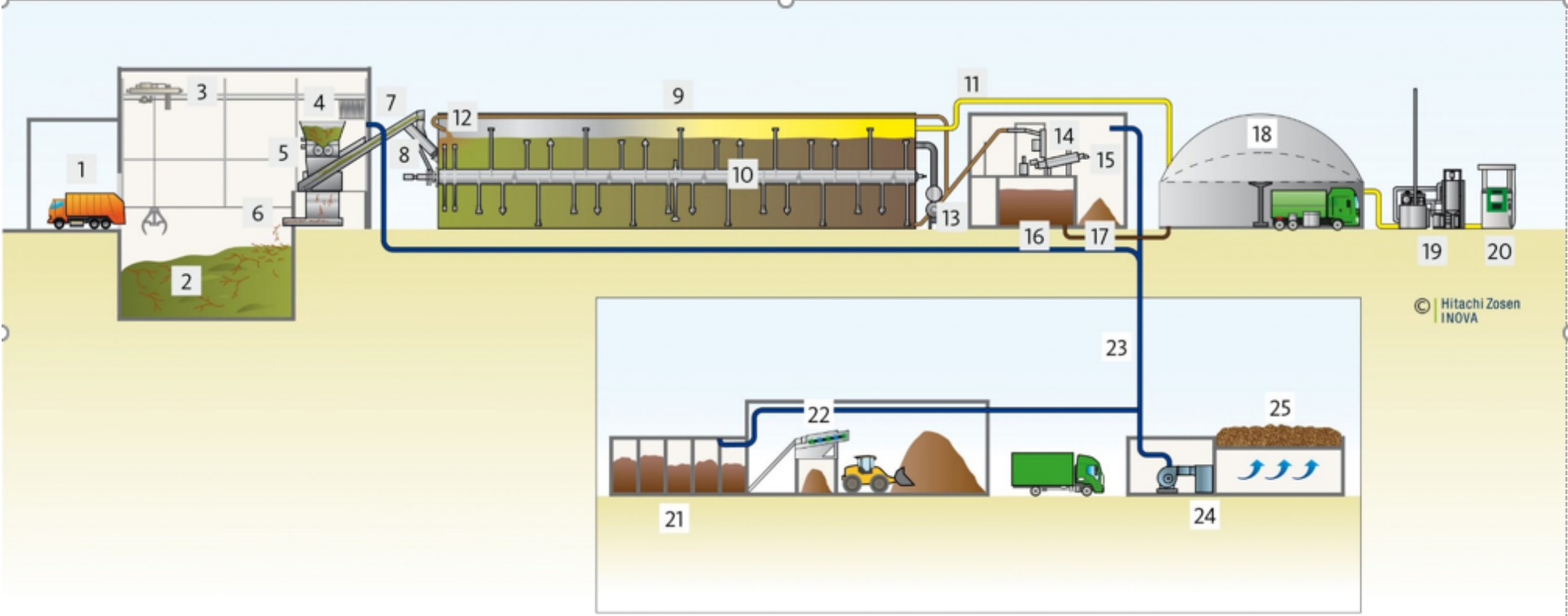
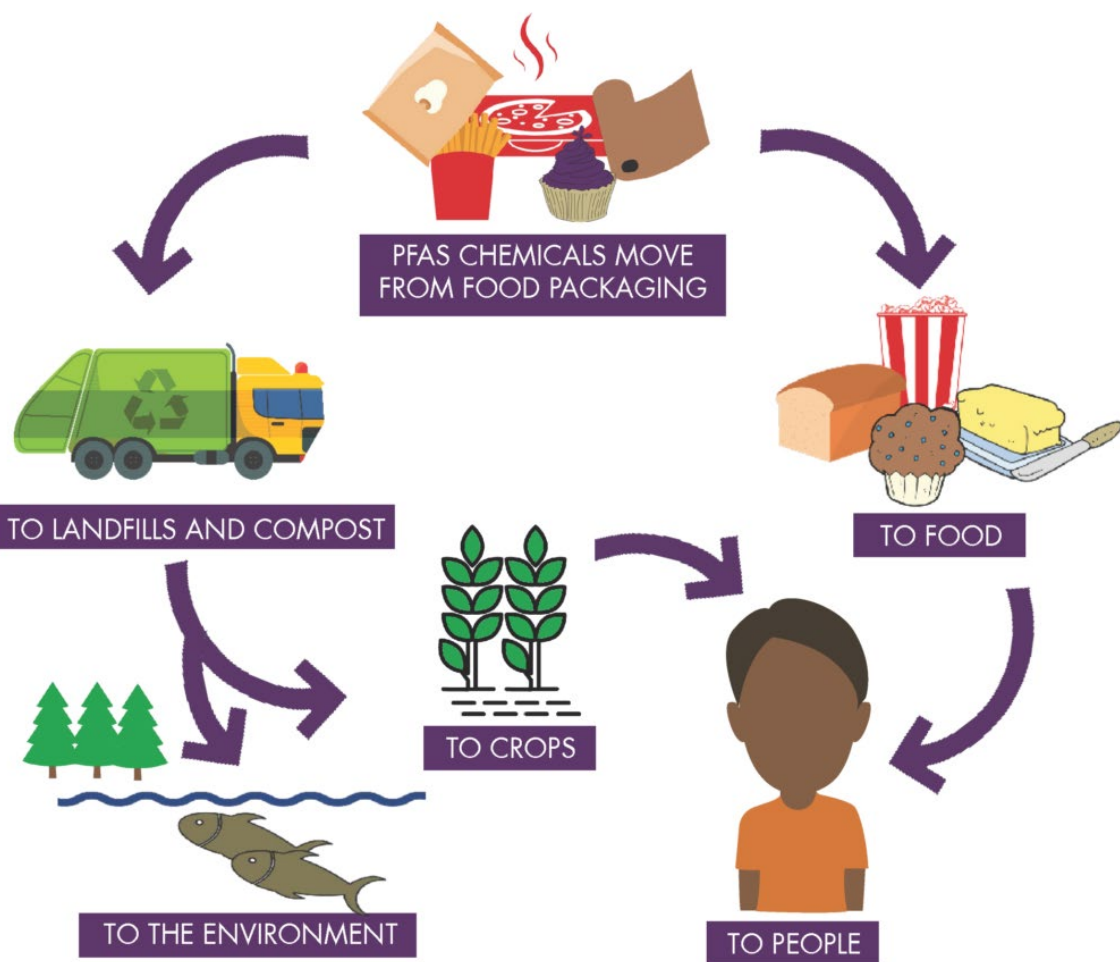


FIGURE 1 BASIC PROCESS DIAGRAM/MATERIAL CYCLE OF THE KOMPOSTOGAS SYSTEM

Waste Reception & Pre-Treatment	Anaerobic Digestion	Liquid / Solid Separation	Gas Utilization	Composting
1 Waste reception	8 Feed System	13 Discharge system	18 Optional biogas storage	21 Aerated composting tunnels
2 Waste bunker	9 Digester	14 Screw press	19 Biogas upgrading system	22 Compost screening
3 Waste crane	10 Agitator	15 HZI SpeedScreen	20 RNG pipeline injection	23 Air ventilation system
4 Shredder	11 Biogas pipe	16 Press cake		24 Air exhaust Scrubber
5 Sieve	12 Inoculation pipe	17 Compost		25 Biofilter
6 Sieve rejects				
7 Conveyor				

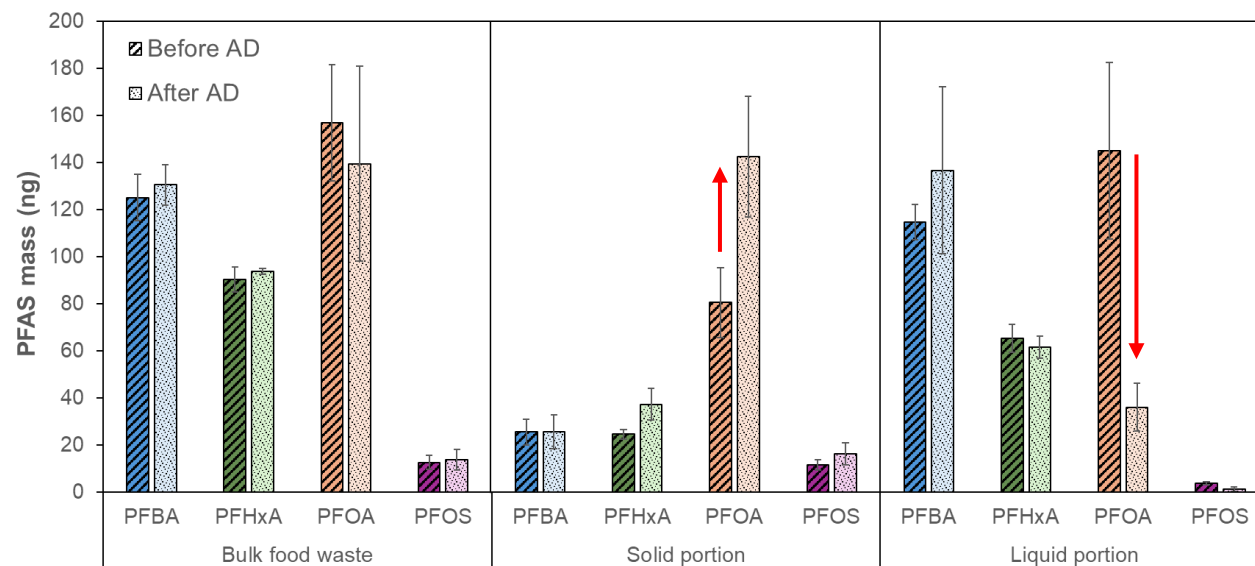
Sustainability barrier

PFAS (“Forever chemicals”) in food waste



Phase 1 results: PFAS do not degrade during AD

Phase 1 approach: Evaluate PFAS partitioning before and after lab-scale AD of model food waste (results for wet digestion shown below)



In fact, they may concentrate into the solid digestate!!

PFAS Destruction

PFAS destruction during the thermal treatment of (digested) food waste



Food waste collection

- Divert food waste from landfills
- Prevent methane emissions



Anaerobic digestion

- Biogas production
- Renewable energy generation (heating)



Thermal treatment

- **Destructive remediation of PFAS**
- Potential renewable electricity generation



Land application

- Nutrient-rich biochar/hydrochar production
- Support local agriculture, businesses



High-Temperature Biochar Process

Summary of Anaerobic Digester Project

- Contracted with Dem-Con HZI Bioenergy LLC
- 70,000 tons/year anaerobic digestion facility to be built at existing Dem-Con facility site in Scott County
- R&E will supply 50,000 tons per year of food scraps and organic rich material
- Additional 15,500 tons needed from other sources/counties
 - It counts towards your recycling goals!
- Products will be Renewable Natural Gas and Biochar
- Biochar tested with 99.9999% PFAS destruction
- Facility operational in late 2027





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Thank you!



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