



**COOL Now**  
*Compostable Organics Out of Landfills Now!*

## ***State of the Art of Organics Management***



Nora Goldstein  
BioCycle

Craig Coker  
Coker Composting & Consulting

July 2024

# Today's Speakers



- 45 yrs. Editor of BioCycle
  - Upgrading Yard Waste Composting Facilities to Take Food Wastes (2023)
  - Residential Food Waste Collection Access in the U.S. (2023)
  - State-based Food Waste Policy Gap Analysis (2022)
- 



- 48 yrs. composting facility engineering and development experience
- 250+ consulting projects since 2005
- 17 yrs. Contributing Editor of BioCycle
- Co-owner – Star City Compost, Roanoke VA (2020-present); Mountain Organic Materials, Asheville NC (1999-2003)

# What is the problem?

- Organics going into landfills
- Food waste = 58% of fugitive methane emissions



Graphic: USEPA, Quantifying Methane Emissions from Landfilled Food Waste, October 2023, EPA-600-R-23-064

# What is the problem, cont.?

■ Methane emissions rising steadily

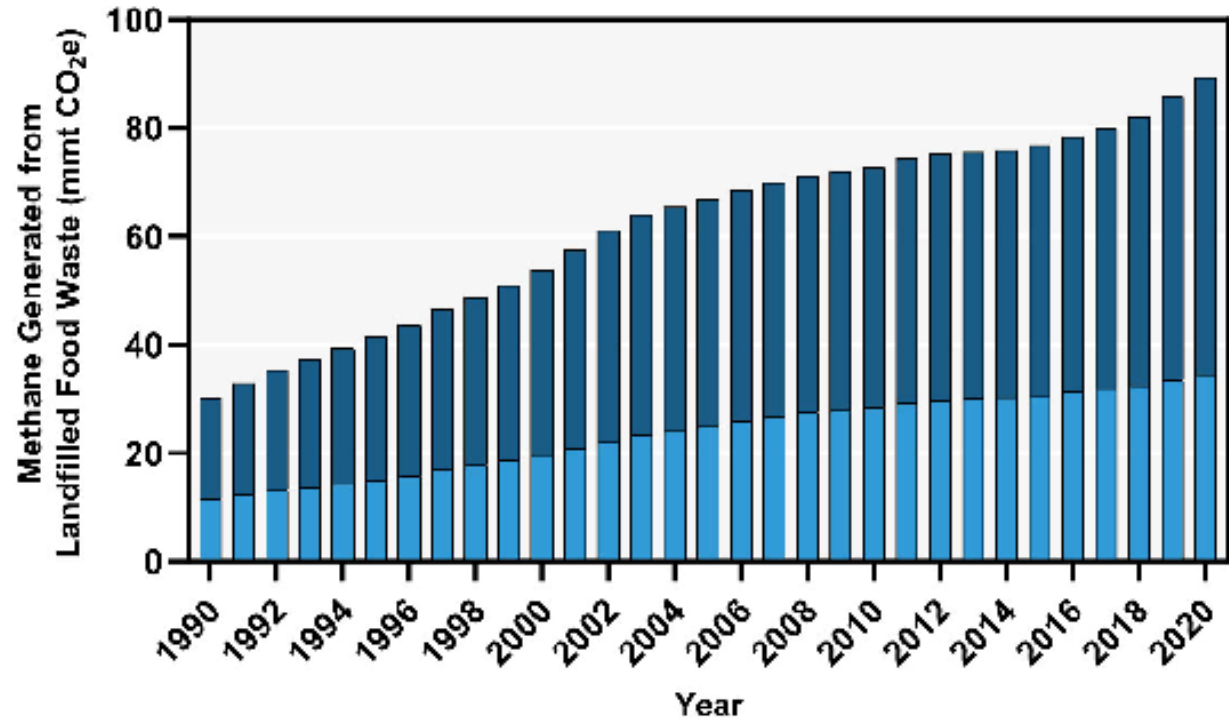
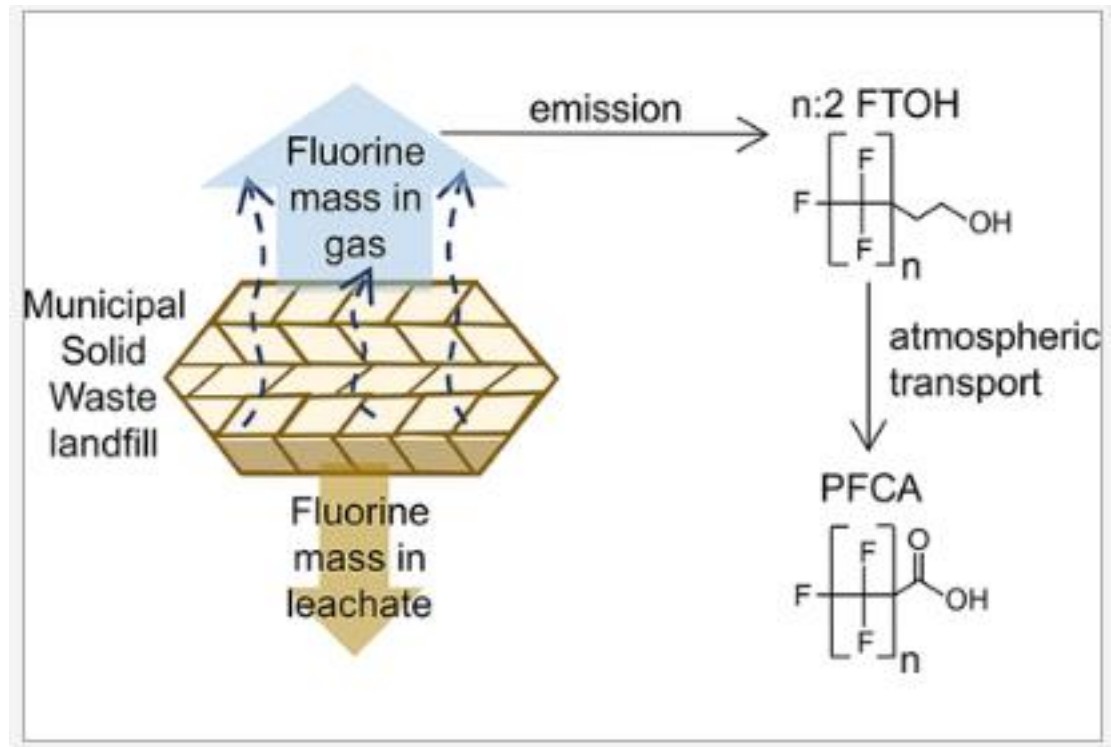


Figure 2. Fate of methane generated from landfilled food waste

Graphic: USEPA, Quantifying Methane Emissions from Landfilled Food Waste, October 2023, EPA-600-R-23-064

# What is the problem, cont.?

- Organics going into landfills
- Airborne PFAS – fluorotelomer alcohols, olefins, acetate and methyl acrylate
- Measured 19 - > 9,900 ppb in LFG



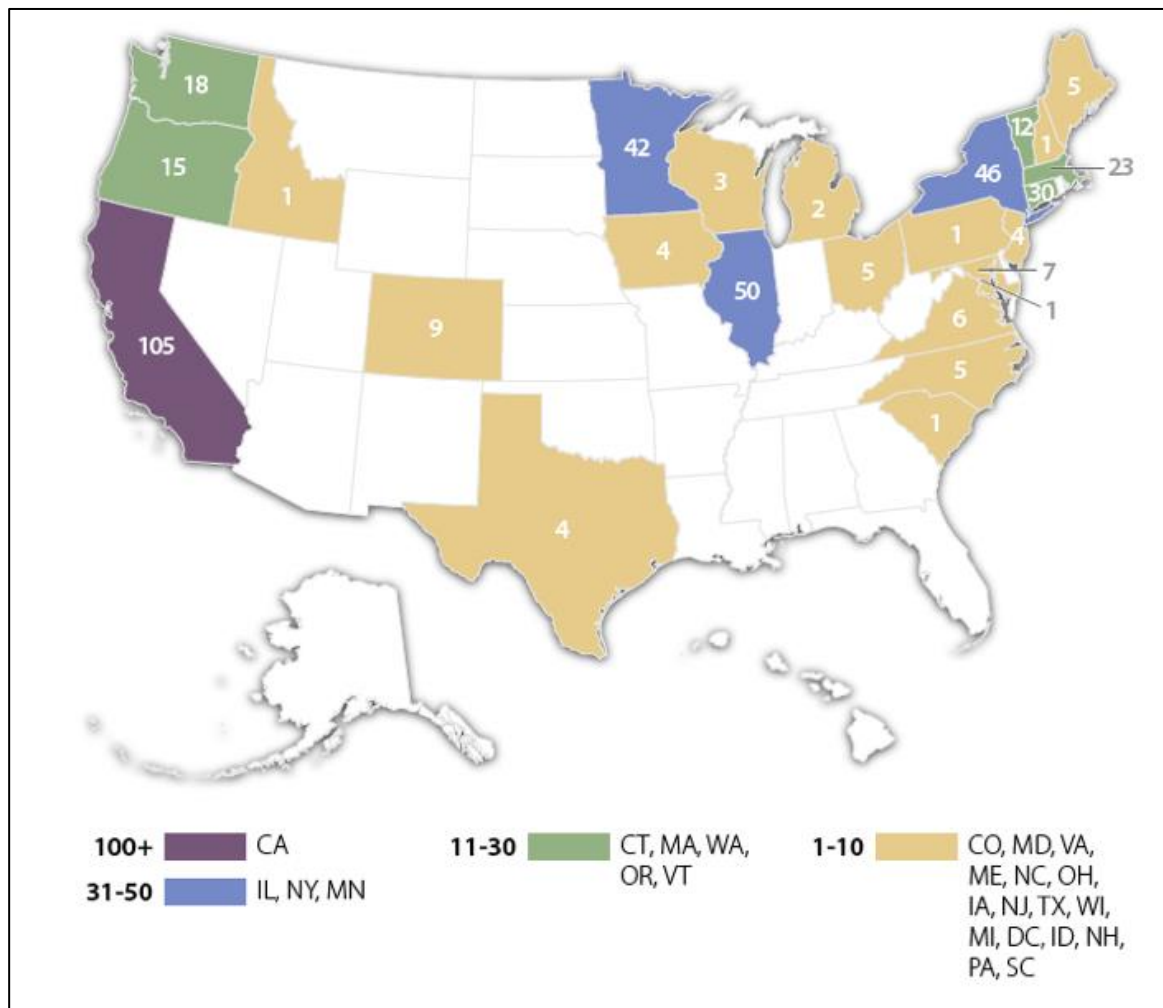
Graphic: American Chemical Society, *Environ. Sci. Technol. Lett.*, 2024



# What is the challenge?

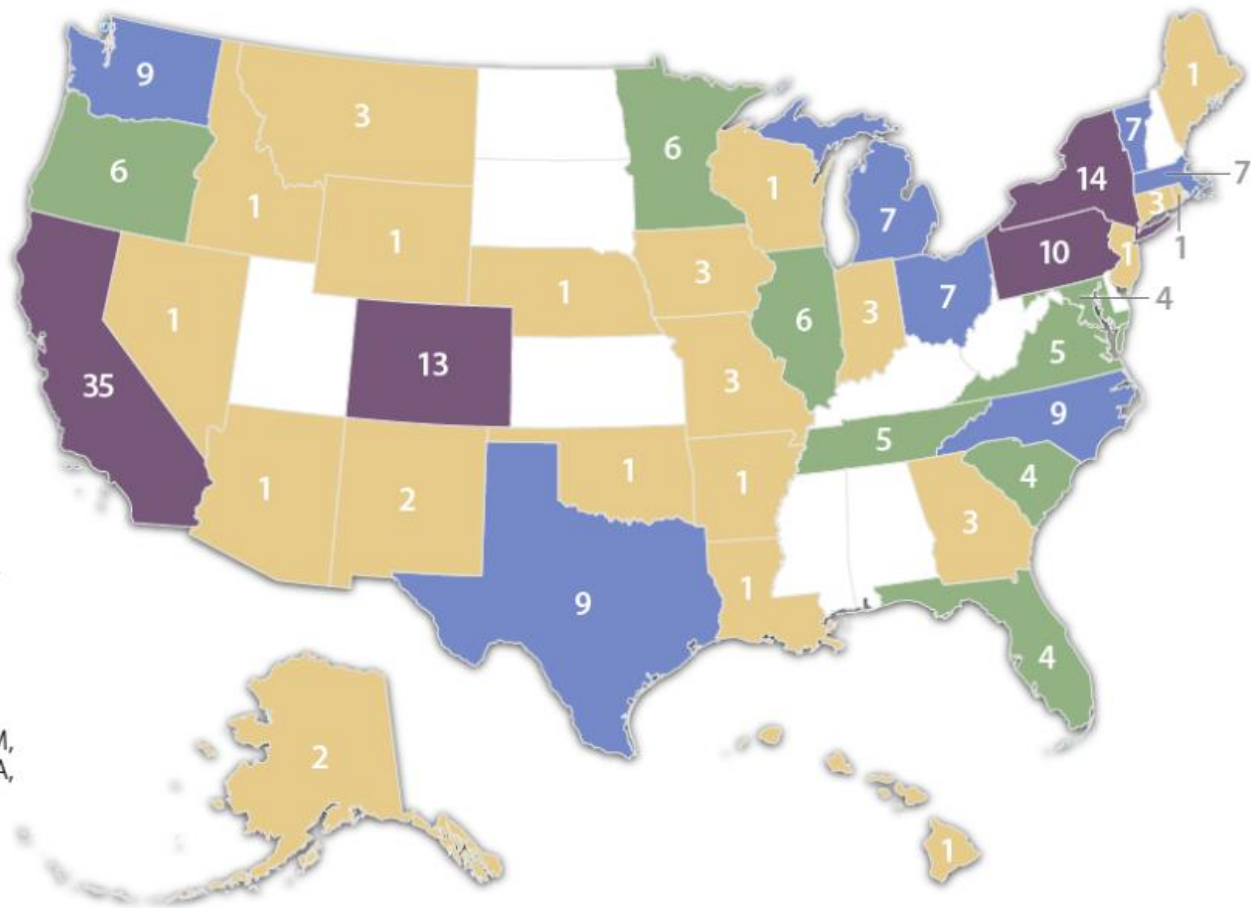
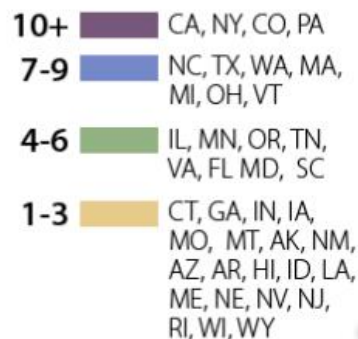
- Not enough access to food scraps collection

Residential Food  
Waste Collection  
Access (2023)



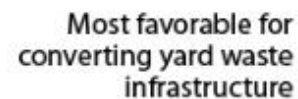
# Insufficient infrastructure

How many food waste facilities in each state?



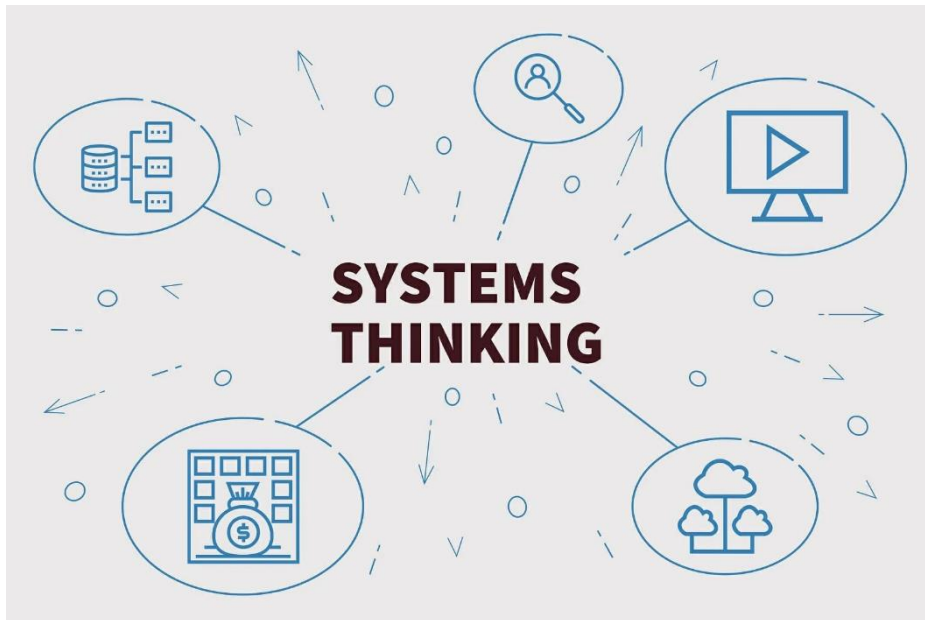
# BioCyc

Least favorable for  
converting yard waste  
infrastructure





# How can the problem be addressed?



- Organics recycling systems
  - Diversionary strategies
  - Collection mechanisms
  - Processing technologies
  - Product usage programs

# Diversionary strategies – Waste Reduction

- Raising awareness
- SWACO – Central OH
  - Save More Than Food campaign,  
<https://savemorethanfood.org/>
  - 23% reduction in food waste & 30% decrease in landfilled food waste
- Oregon DEQ – [www.dontletgoodfoodgobad.org](http://www.dontletgoodfoodgobad.org)
  - 85% of Oregon households agreed they could do more to reduce food spoilage.

# Diversionary strategies – In-home processing

- Essentially grinder/dehydrators
- Output can be used in BYC bins



# Diversionary strategies - BYC

- Offer bins year-round/DIY rebates
- Consider using trained staff to assist elderly/disabled
- Measuring success
- Leaf/carbon banks





# Diversionary strategies – community composting

- Use pest-resistant designs
- Master Composter training programs



Graphic by Coker Composting & Consulting



# Collection Mechanisms



# Collection systems are changing

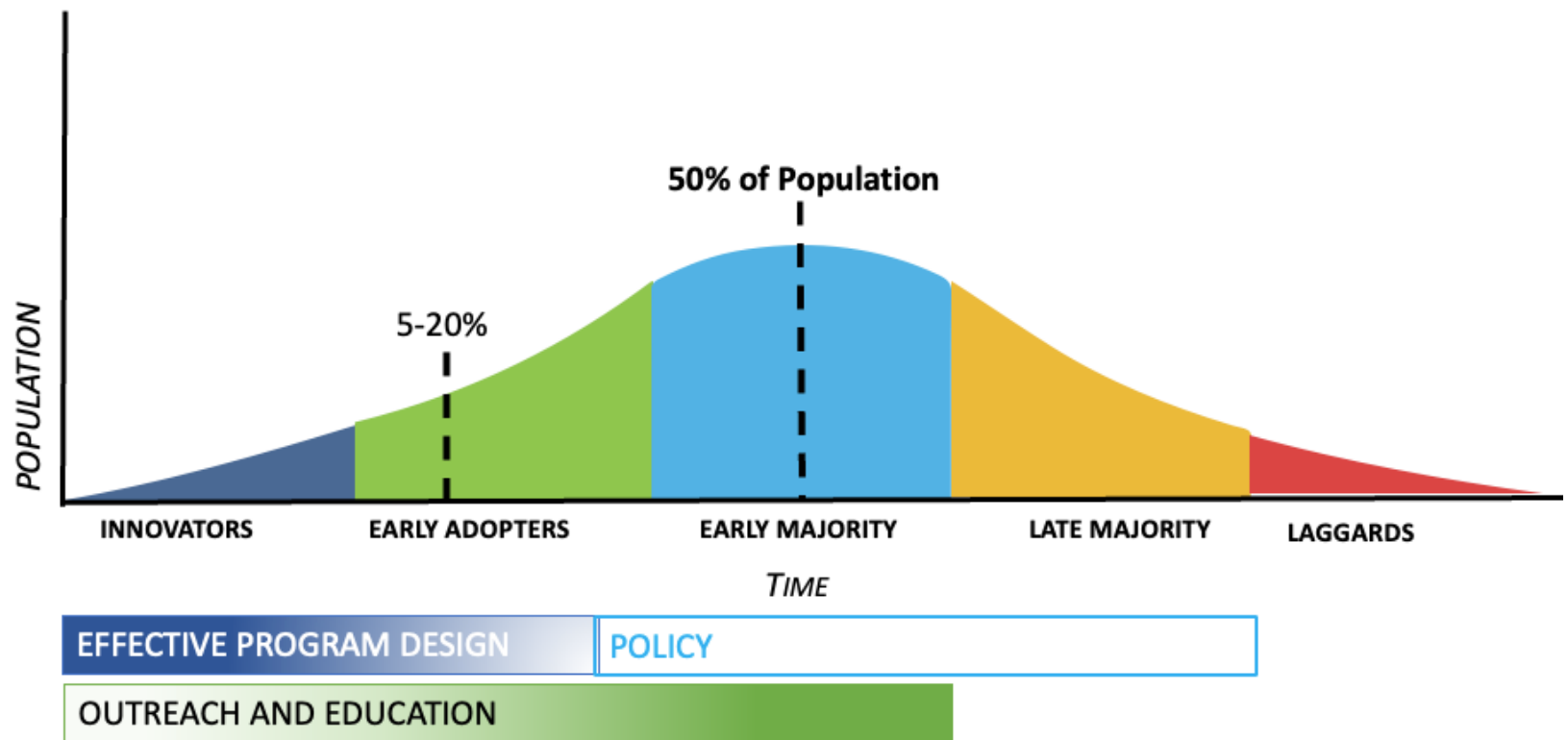
- Shift to automated side loaders – one-person crew
- Hard to monitor SSO diversion and quantities



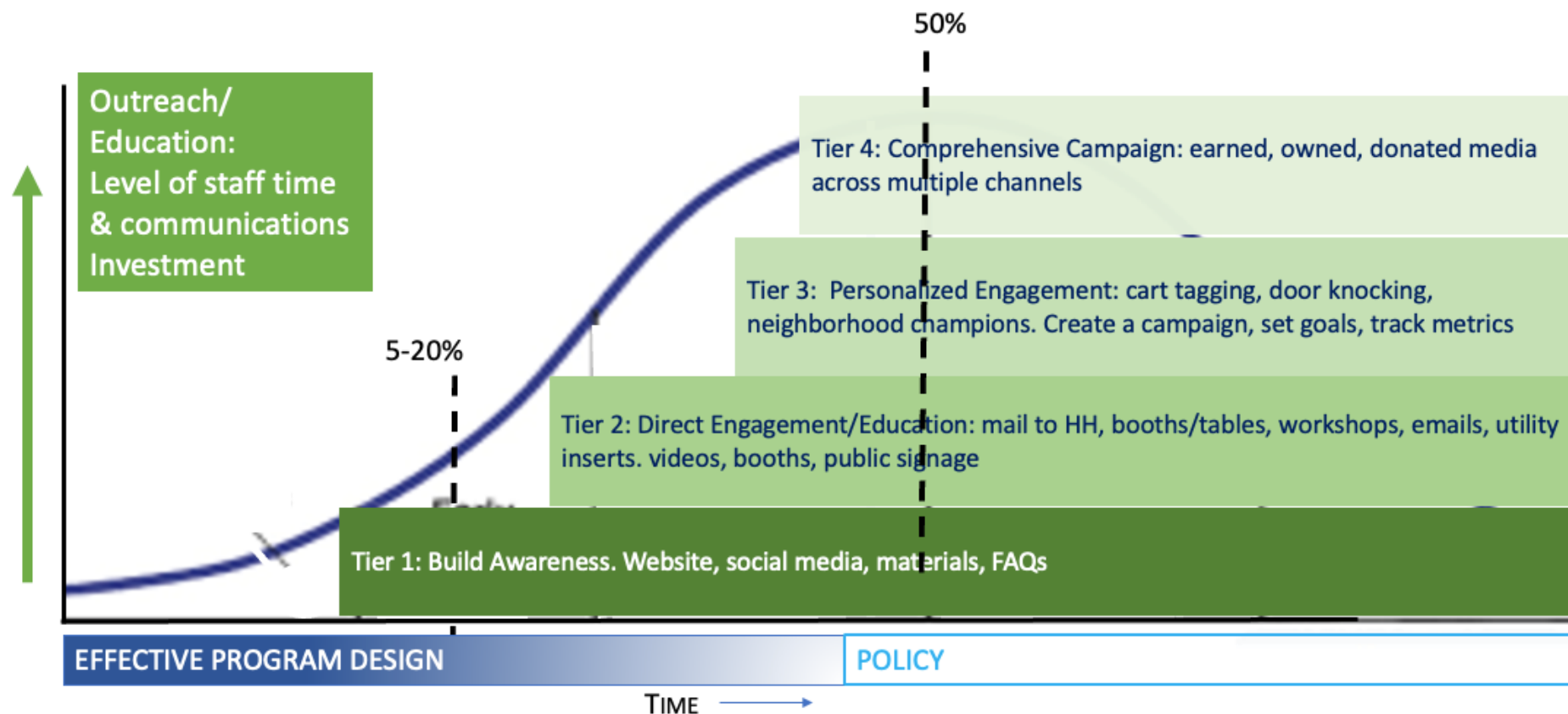
New Way ROTO PAC®  
14 CY Automated Side  
Loader for organics

# Problem #1 – Low participation rates

- Solution – sustained and prolonged education and outreach



# Program Design Has An Outsize Impact on Program Success



Graphic by Amplify for Change



# Problem #2 – Inadequate route density

## ■ Solutions

- Incentivize with Pay-As-You-Throw (PAYT)
- Create carve-outs in franchised hauler agreements for microhaulers, use of technology innovations



**Get a Smaller Brown Cart.  
Pay a Smaller Trash Fee.**









# Vancouver, WA

- Curbside collection to 47,600 residents using PAYT
- SSO goes to Dirt Hugger for composting

## Scenarios

32 gal garbage weekly without Organics

32 gal garbage every other week + 20 gal Organics



\$25.28

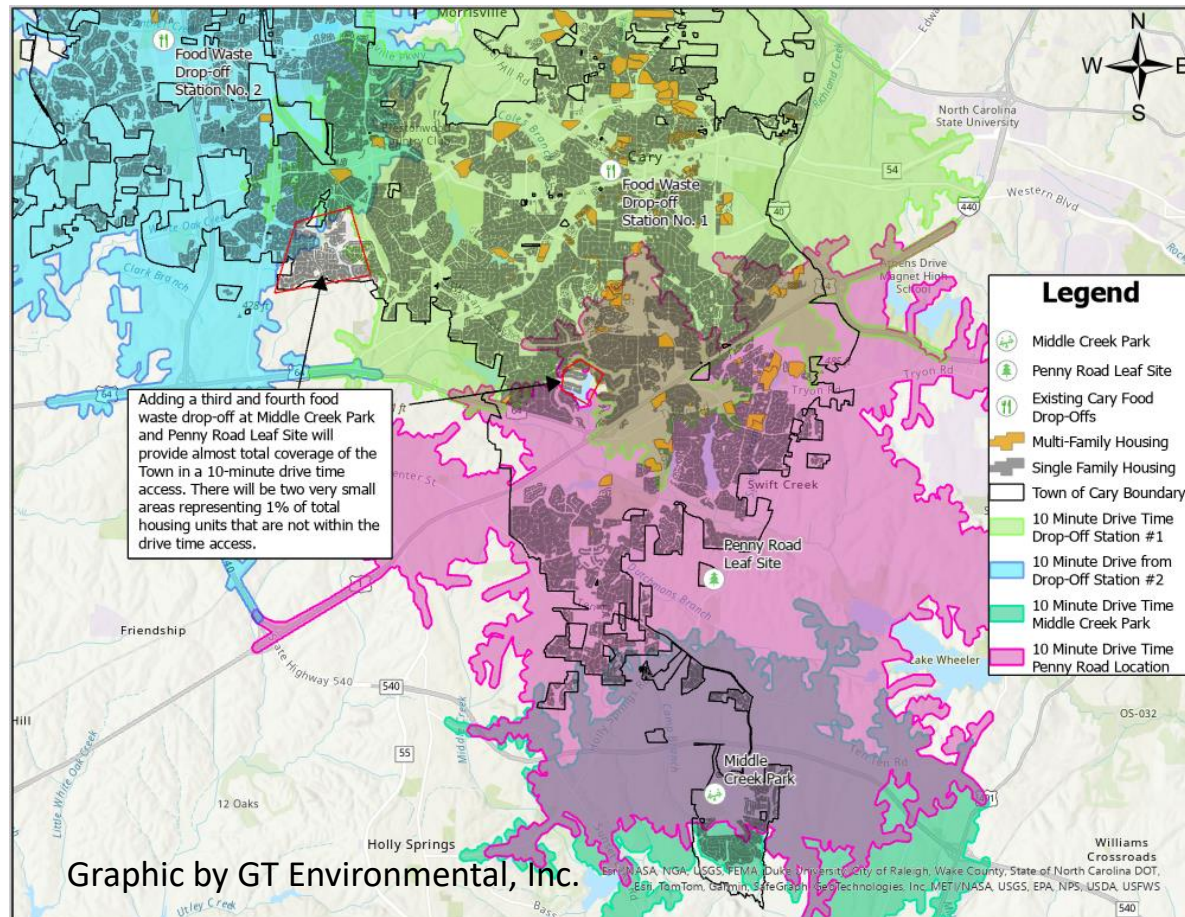
$\$20.01 + \$4.80 = \$24.81$

## Problem #3 – GHG emissions driver

- Not enough motivation to divert SSO in order to reduce GHG emissions
- Solution – include food loss/waste in Climate Action Plans
  - Tie in with home/building decarbonization
- Also – push for landfill methane emissions monitoring and reduction programs
  - Use compost as Alternative Daily Cover to mitigate methane fugitive emissions

# Collection mechanisms – drop-off

- 170 municipally-supported drop-off programs in U.S.
- Siting- public facilities; 10-min drive time



# SSO Processing



McGill Environmental Composting,  
New Hill NC

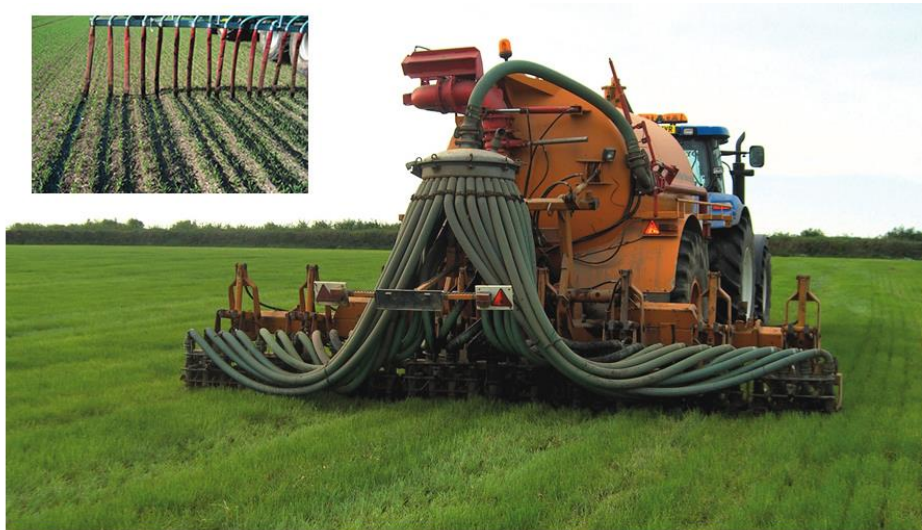
Quasar Energy, Wooster OH





# Composting & AD – compatible or competing?

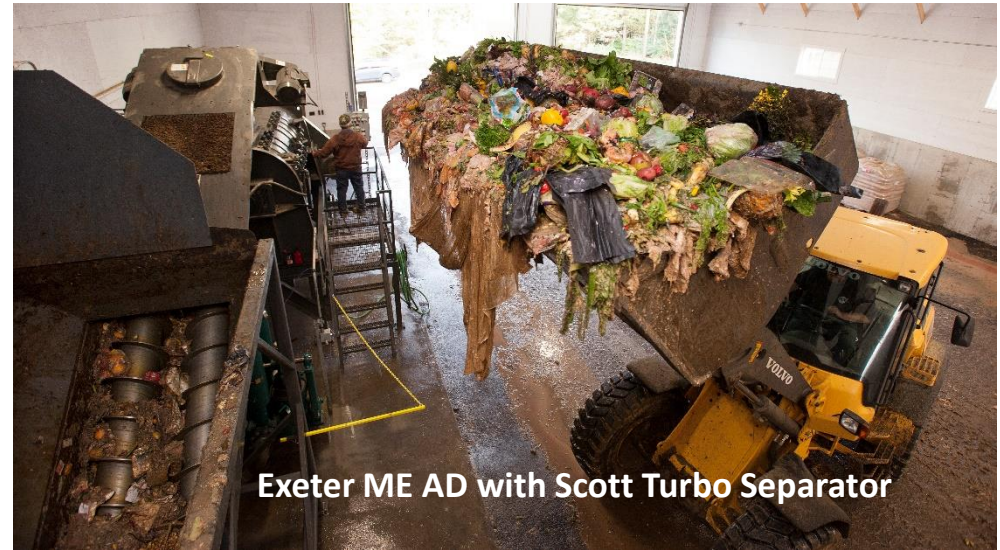
- Compatible – AD is energy extraction
- Need a market for the biogas
- Need a method of handling digestate



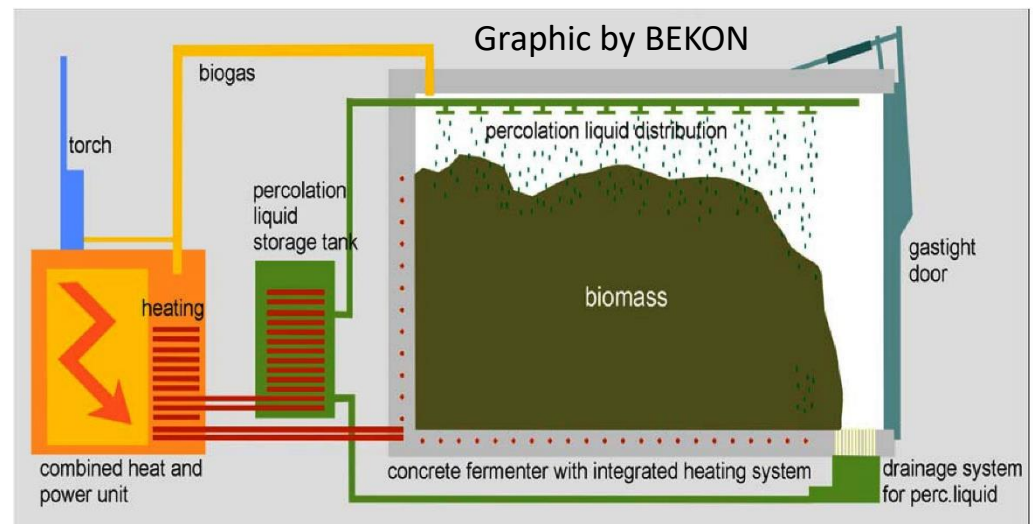


# Anaerobic digestion

- SSO collected separately from yard trimmings
  - Low solids AD
  - Depackaging/slurrying needed

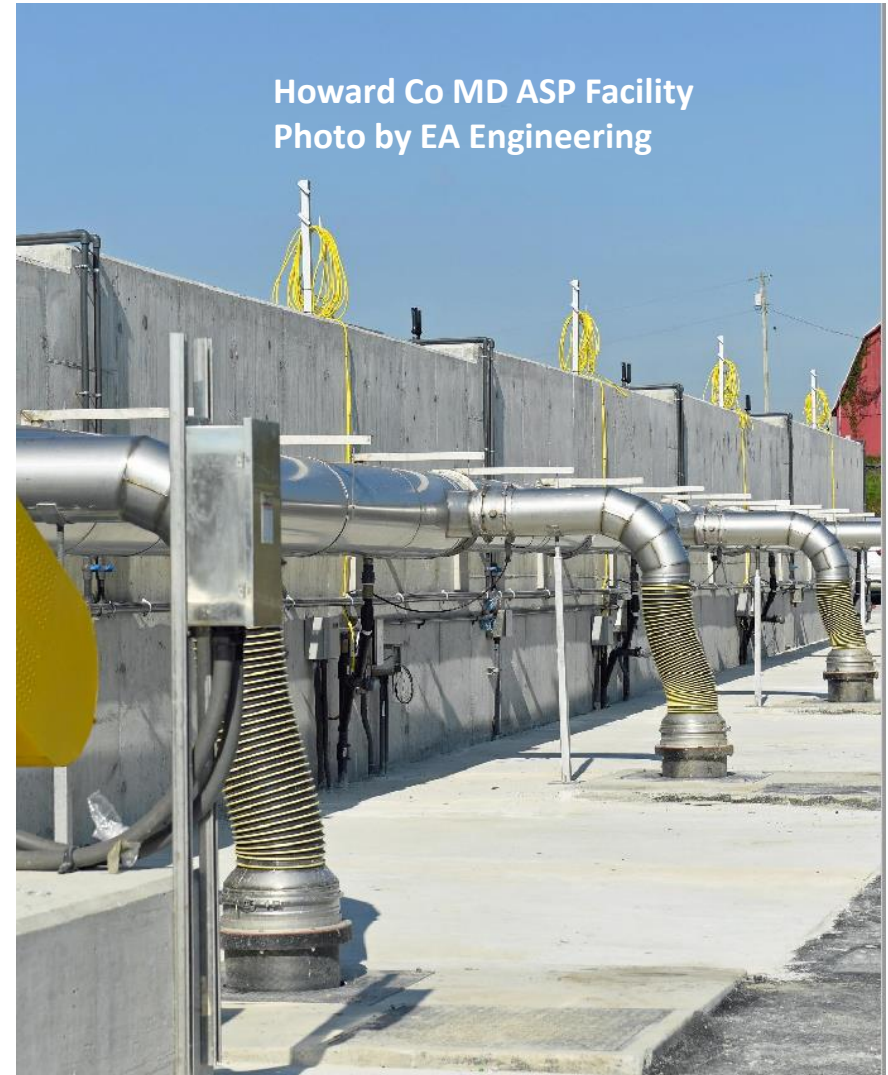


- SSO co-collected with yard trimmings
  - High solids AD



# ASP Composting

- Aerated static pile (ASP) becoming more popular
- Better process control
- Faster composting
- Aeration rate
  - 5 cfm/cy – peak
- Aeration floors
  - Perforated pipe
  - Spargers



# Problem #1 – How to ensure scalability?

- Start with waste characterization study
- Forecasts
  - Residential – function of pop/HH growth
  - Commercial – hard to say
- Participation rates are wildcard
  - Models use Lo-Med-Hi ranges
  - Low : 5%; Medium : 20%; High : 60%
- Processing scalability
  - AD – very challenging
  - Composting – easy w/ windrow or ASP, more challenging with in-vessel



## Problem #2 - NIMBYism

- Usually in siting and local approvals phase
  - Can be costly
- Solutions-
  - Large sites (\$\$\$)
  - Use other waste management sites
    - Closed landfills
    - WWTPs



Central Valley Water Reclamation Facility, Salt Lake City



# Problem #3- Front-end loaded costs

- Upfront costs can be large
- Investors need good financial data
- Innovative funding ideas needed

The Composting Handbook, 2022

Table 19.4 Common composting expense items.

Initial (start-up)	Operational	Product distribution	Administrative and management
Business research and business plan development	Labor	Product promotion and advertising	Salaries for managers and office staff
Attorney fees	Fuel and lubricants	Sales	Office supplies
Accountant fees	Equipment amortization	Broker commissions	Office utilities
Engineering fees	Amendment purchase	Travel	Rent
Paving (e.g. hard standing)			
Civil engineering works			
Financing costs	Electricity	Product samples	Business insurance
Permits	Water	Demonstration projects	Health insurance
	Leachate management		
Feedstock procurement costs	Equipment wear parts	Sponsorships	Payroll taxes
Coverage for 6–12 months of operational expenses	Equipment replacement	Shipping/delivery	Business taxes
Site acquisition and/or development	Trucking	Application	Professional services (attorneys, accountants, engineering)
Equipment purchases	Soil blending ingredients	Trucking	Training
Financial assurance for closure	Compliance testing		

# Product usage programs



# Recovered organics products

- Biogas
  - Electricity or RNG
- Digestate
  - Liquid, dried, or composted
- Compost
  - High-quality product essential
- Compost-based Soils
  - Dampens seasonal sales variability
- Compost-enhanced Mulches
  - Screened overs run through grinder

# Requirements for successful product usage programs

- Marketing/sales plans
- Create “structural demand” for product
  - Minimum soil organic matter content
  - Redevelopment soil profile rebuilding







# Questions?

**Nora Goldstein**  
**BioCycle**  
**(484) 866-3832**  
**[noragold@biocycle.net](mailto:noragold@biocycle.net)**  
**[www.biocycle.net](http://www.biocycle.net)**

**Craig Coker**  
**Coker Composting & Consulting**  
**(540) 874-5168**  
**[ccoker@cokercompost.com](mailto:ccoker@cokercompost.com)**  
**[www.cokercompost.com](http://www.cokercompost.com)**