



Landfills & Organic Bans: Are Anaerobic Digesters the Answer?





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Today's Discussion

- The Situation

- Landfill (200,000 TPY) with LFGTE system 
- Organics Landfill Ban enacted

- The Response

- Do nothing and risk losing organic waste & biogas production 
- Add qualifying system to capture organic waste 

- The Questions

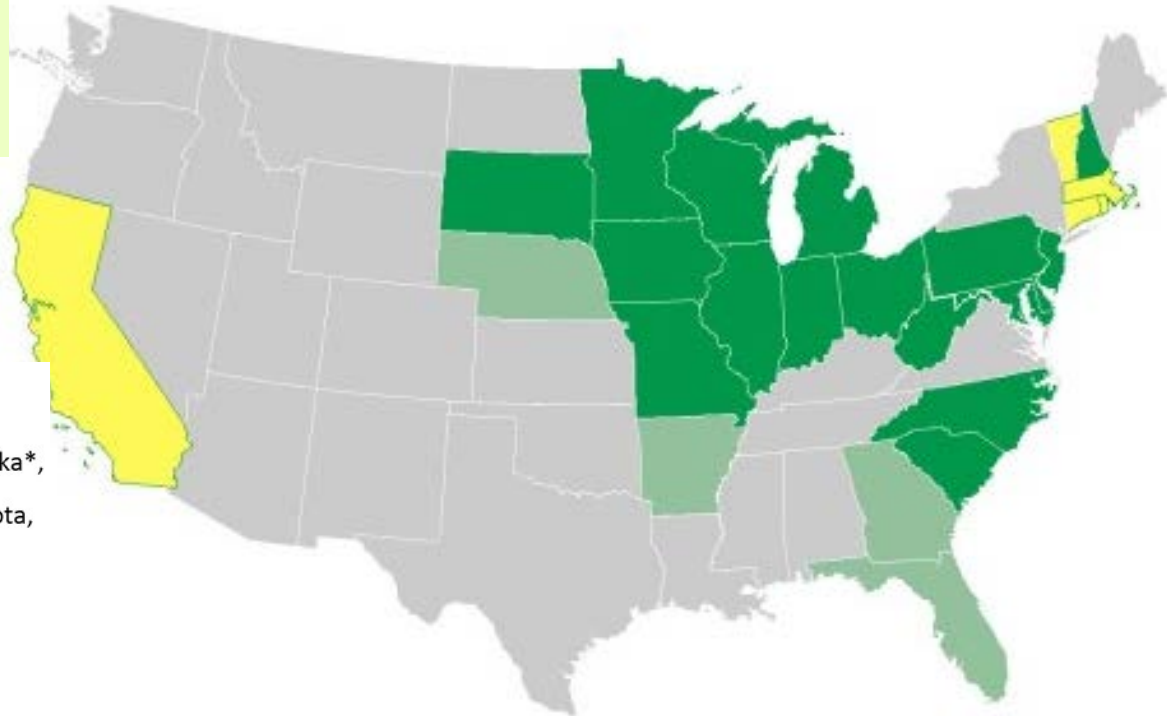
- Is more biogas produced with the addition of an AD?
- What are the economic impacts?

Landfill Bans – coming to NY or NJ?

States that Ban Organics or Mandate Organics Recycling - October, 2014

NYS Legislation being developed?

NJ Legislation being developed?



Ban/mandate some yard debris: Arkansas*, Delaware, Florida*, Georgia*, Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska*, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, West Virginia, Wisconsin

*Allow yard debris disposal in landfills that generate energy

Ban/mandate food scraps: California, Connecticut, Massachusetts, Rhode Island, Vermont.
Also of note: New York City, Seattle

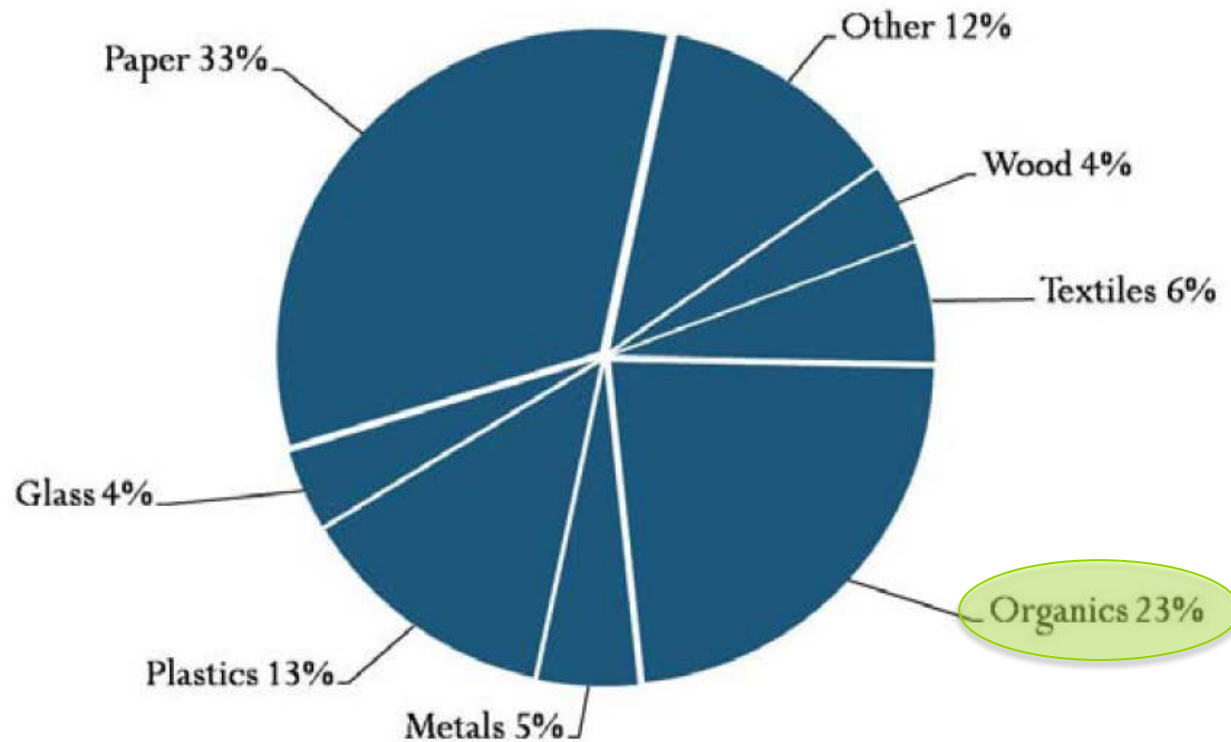
Zoe Neale, Mass Organics Solutions LLC, Biocycle East

Landfill Ban Structures

	CT	VT	MA	NY (coming?)
Effective Date	January 2014	July 2014	October 2014	2021
Who is affected	Commercial & Industrial	Universal	Commercial & Industrial	Large Generators
Tonnage	104 tons/yr (2 ton/wk)	104 tons/yr (2 ton/wk)	52 tons/yr (1 ton/wk)	104 tons/yr (2 ton/wk)
Reach/Radius	20 miles	20 miles	No limit	50 miles
Key Exemption	Schools & hospitals			

What is at stake...

Figure 1 - Estimated MSW Generation in New York State



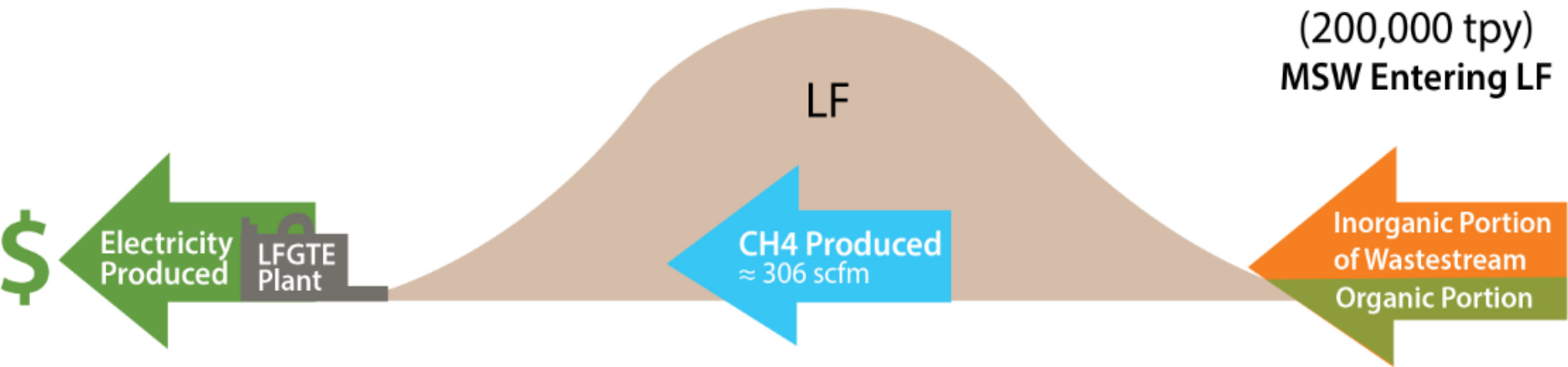
Source: NYSDEC Beyond Waste

Ban Impacts for Landfill Owners

- Reduced tonnage (loss of 23% of MSW)
- Lower LFG generation rates
- Extended Site Life
- Smaller Host Community payment

MSW Landfill with LFGTE System

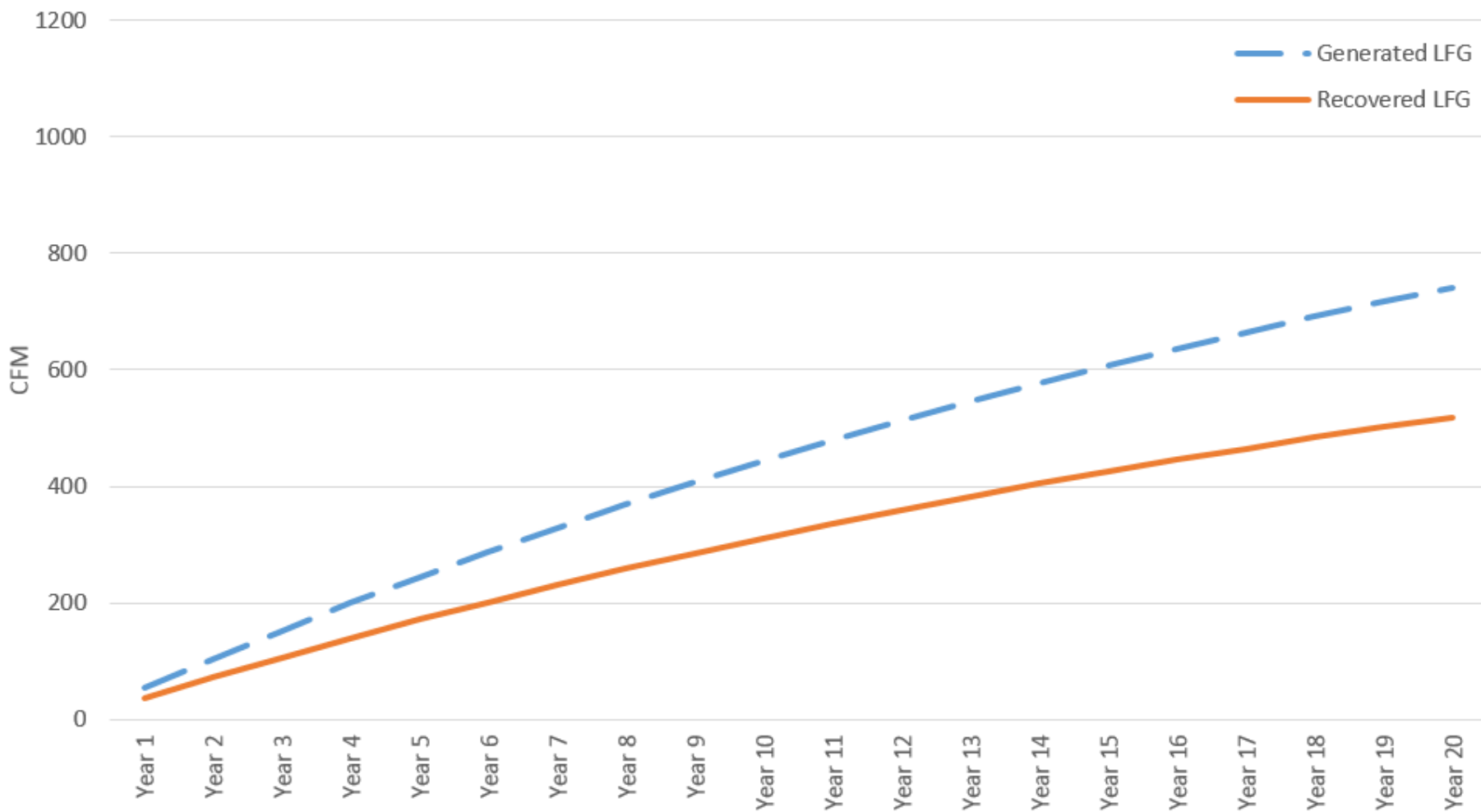
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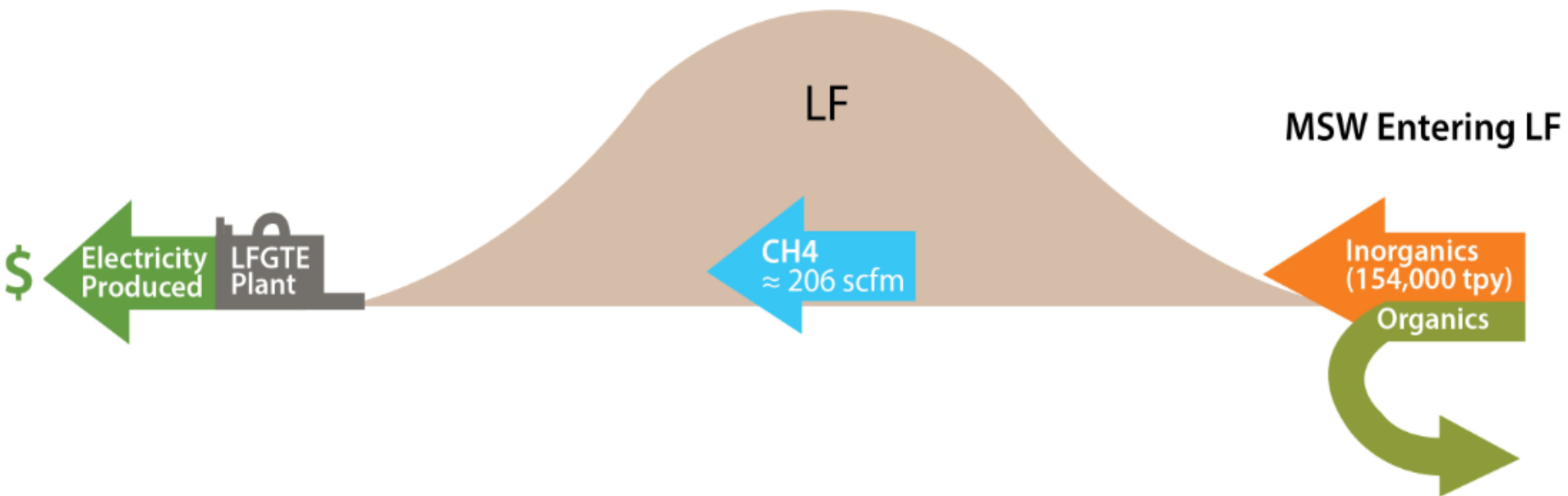
MSW Landfill with LFGTE System

1

Typical Landfill - 200,000 tpy

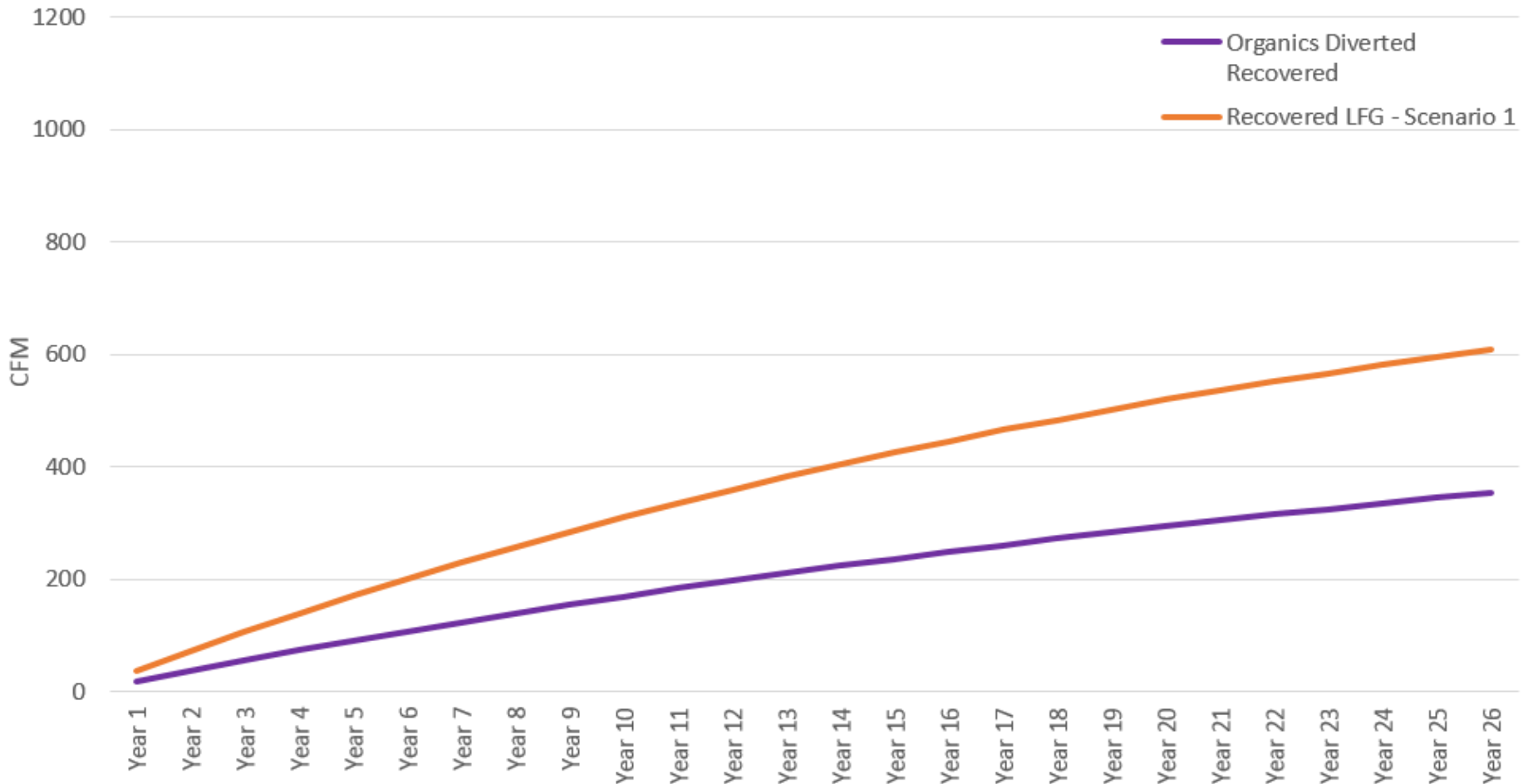


Landfill with Loss of Food Waste 2

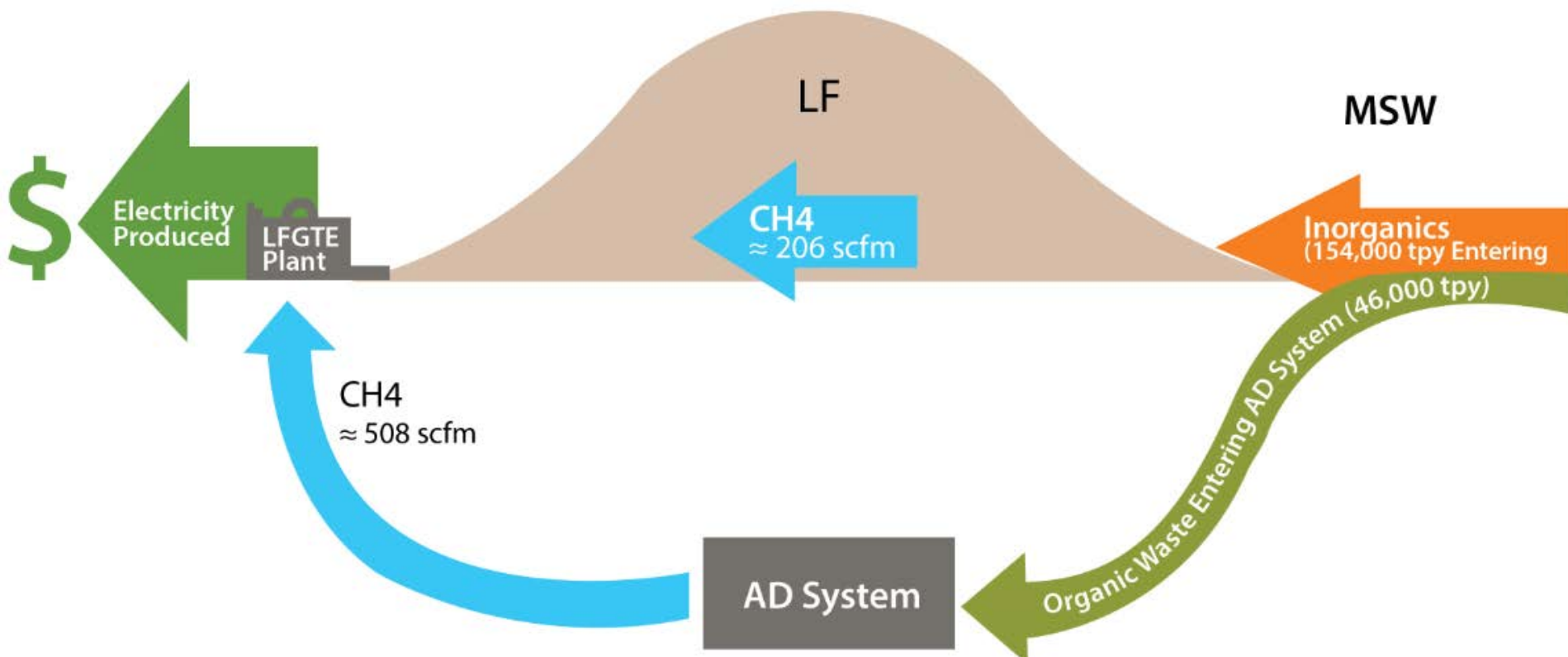


Landfill with Loss of Food Waste 2

Organics Diverted off-site - 154,000 tpy

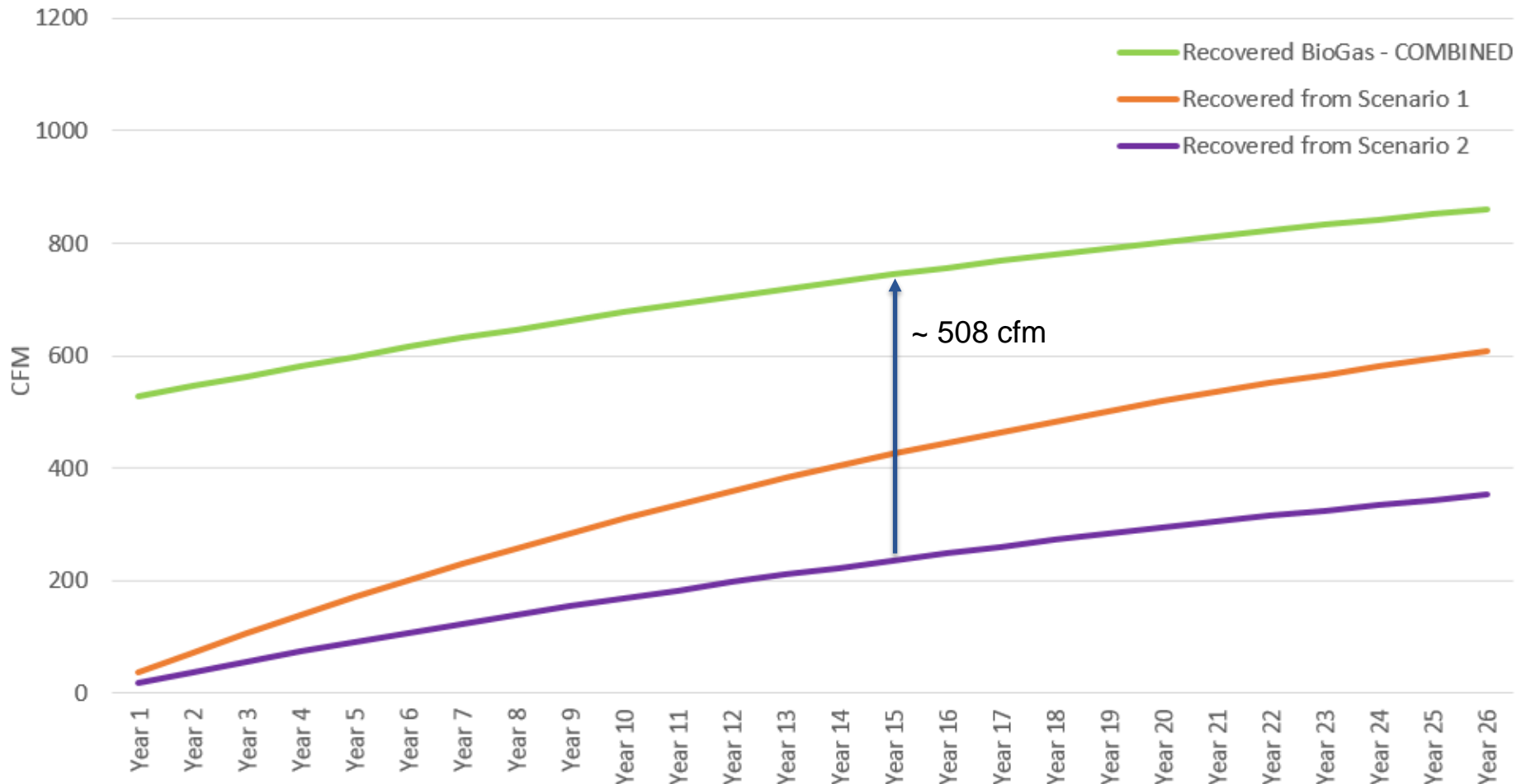


Landfill with Loss of Food Waste & Digester Added 3



Landfill with Loss of Food Waste & Digester Added

Organics Placed in On-site Digester



Back to the Economics

- Net Present Value Analysis

- Three scenarios

1 • Typical LF with LFGTE

2 • Landfill: loss of organics

3 • Landfill: loss of organics & Anaerobic Digester addition

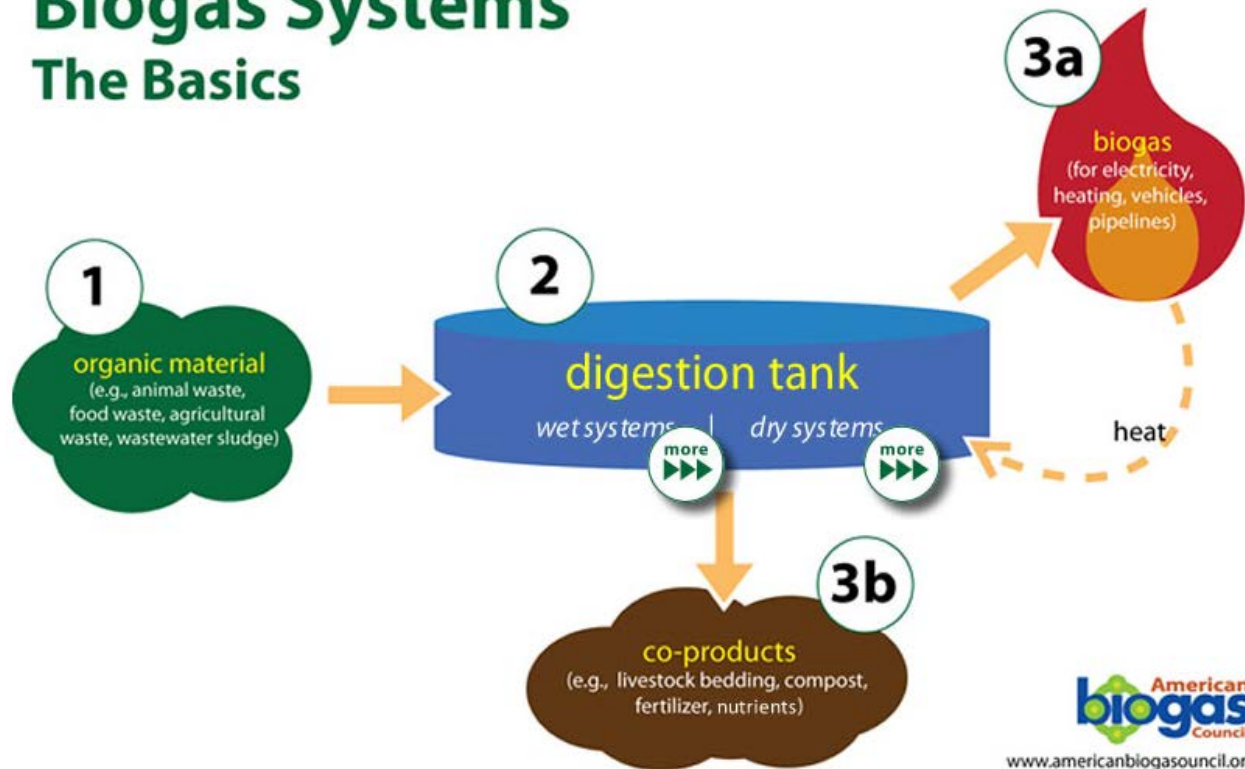
Back to the Economics – LF Parameters

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- **Key Landfill Inputs:**
 - Annual Tonnage & Remaining Capacity
 - Revenue: Tip Fee, LFGTE
 - Costs: O&M, Construction, Closure/PC

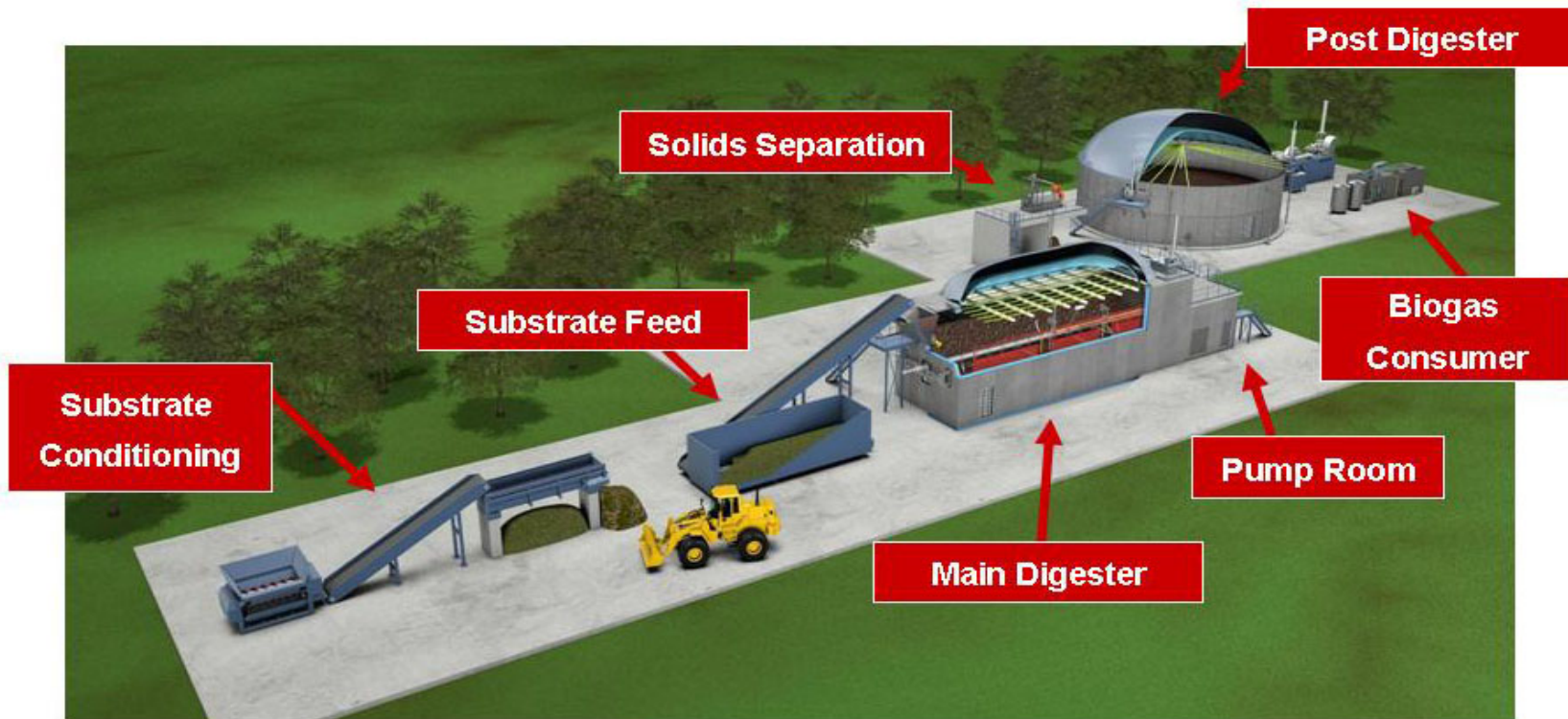
Back to the Economics – AD Parameters

-- Capital Costs – Revenue -- Costs

Biogas Systems The Basics



Capital Costs - AD



Eisenmann High Solids AD System 3D-Model

Capital Costs - AD

- Cost per ton of Annual Digester Capacity ¹
 - \$463/ton of capacity (50,000 tons annual capacity)
- Locating at a LF offsets some costs
 - Cost reduction 30%
 - LFGTE/Flare
 - Leachate, Stormwater, access roads, scales, odor control, etc.
- Assumes no Grants

¹ Biocycle

O&M - AD

- Processing Feedstock
- Limited staff
- Monitoring
- Overlap with existing energy generation
- Cost per ton or % of total capital costs
 - Using \$9/ton

Other Key Inputs

- Tip Fee
 - MSW - \$60/ton, SSO - \$45/ton
- Electricity rate
 - 6 cents/kWh
- Digestate
 - No cost or revenue
- Inflation rate – 2%
- Interest rate – 6%

NPV Summary

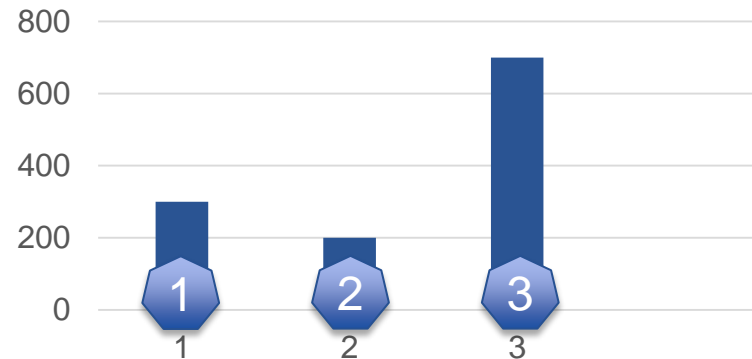
	NPV	Revenue Loss
1 Typical MSW LF	\$88 million	
2 LF losing Organics	\$57 million	\$31 million
3 LF adding AD	\$64 million	\$24 million

Tax incentives or grants not incorporated

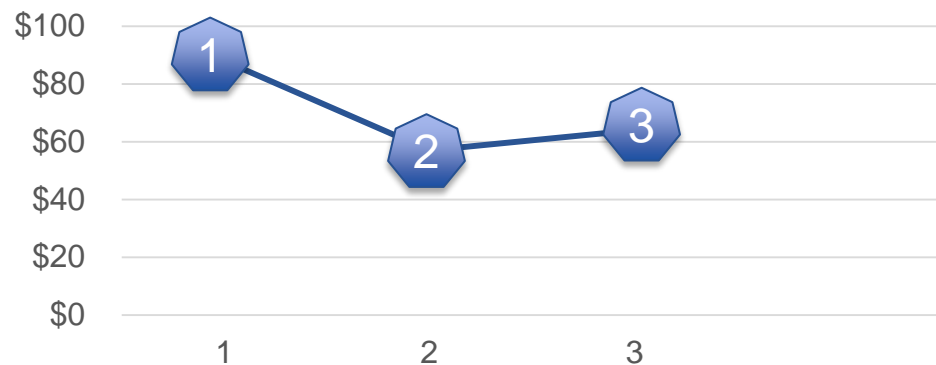
Questions Answered

- Biogas: increased AD incorporated
- Revenue loss: reduced with addition of AD

Average scfm Biogas Collected



NPV (millions)



Questions to be Answered

- Would SSO tip fee need to be lower
 - If no reduction of tip fee – Revenue Loss \$15 million
- AD capital cost @ \$17 million for a 50,000 ton/yr system – is that too high with more AD development
- Effect of Grants
- Picture different with RNG and value of RINs
- Organics to AD – would a \$/ton need to go into State LF escrow account? Or more money to operator/owner
- Impact of accepting more SSO tonnage – total tonnage greater than 200,000 TPY

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