

From Food to Power in Pittsburgh: A Financial and Policy Analysis of Industrial Food Waste as an Anaerobic Digester Feedstock

Allison Saunders¹

Department of Agricultural and Biological Engineering
Penn State University
¹Seattle University



Introduction

- 23% of US methane emissions are attributed to decomposition of food waste^[1].
- Cities, such as Pittsburgh, PA can divert food waste from landfills to Anaerobic Digestion facilities, which can produce renewable biogas and compressed natural gas (CNG).
- Pittsburgh does not currently have municipal collection infrastructure for food waste, posing financial and logistical challenges to collecting and transporting this resource.
- There are both policy incentives and barriers to the collection and transportation of food waste.



Figure 1. While most food wastes are currently disposed of in landfills (A), local universities are piloting food waste collection and composting program (B&C).

Background

- Anaerobic Digestion (AD) is a biochemical process under which microorganisms break down organic matter.
- Pittsburgh, PA has identified AD as an important technology to help the city achieve two goals laid out by its 2017 Climate Action Plan^[3]:
 - 80% reduction of 2020 greenhouse gas (GHG) emissions by 2050
 - 90% reduction of organic waste from landfills by 2030

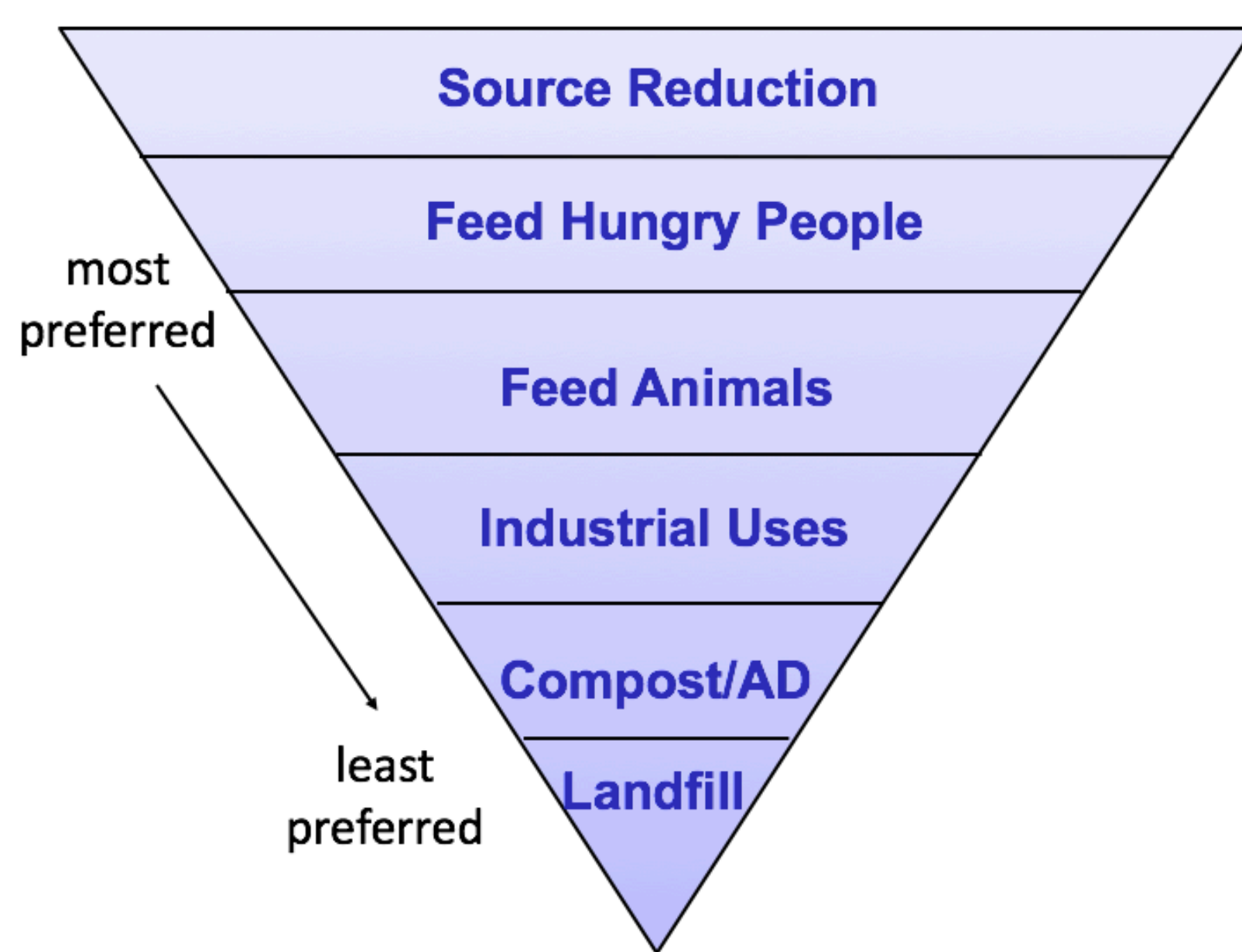


Figure 2. AD fits into the Food Recovery Hierarchy at the current 'composting' point. Adapted from epa.gov

Significance

- No anaerobic digesters in Pennsylvania currently use food waste as their primary feedstock, giving food waste to energy a huge potential for reducing greenhouse gas emissions in Pittsburgh.

Methods

- Identified potential sources and biomass of food waste in Pittsburgh*
- Identified % of food waste collectable based on other case studies
- Examined food waste pickup and transportation infrastructure through case studies on other cities
- Approximated cost of implementing transportation infrastructure using EPA cost calculator^[2]

Results

- Approximately 60% of Pittsburgh's food waste is industrial food waste.
- Collection and transportation cost estimate: \$8.5 million/year^[2]
- Upfront investment of \$2,200 for food separation costs for producers of 1 ton of waste/day^[2]
- Tipping fees lower than those charged by landfills are essential to incentivize food waste producers to choose AD.
- From industrial and residential food waste pickup alone, Pittsburgh can meet 25% of its goal to divert 90% of landfill waste^[4].

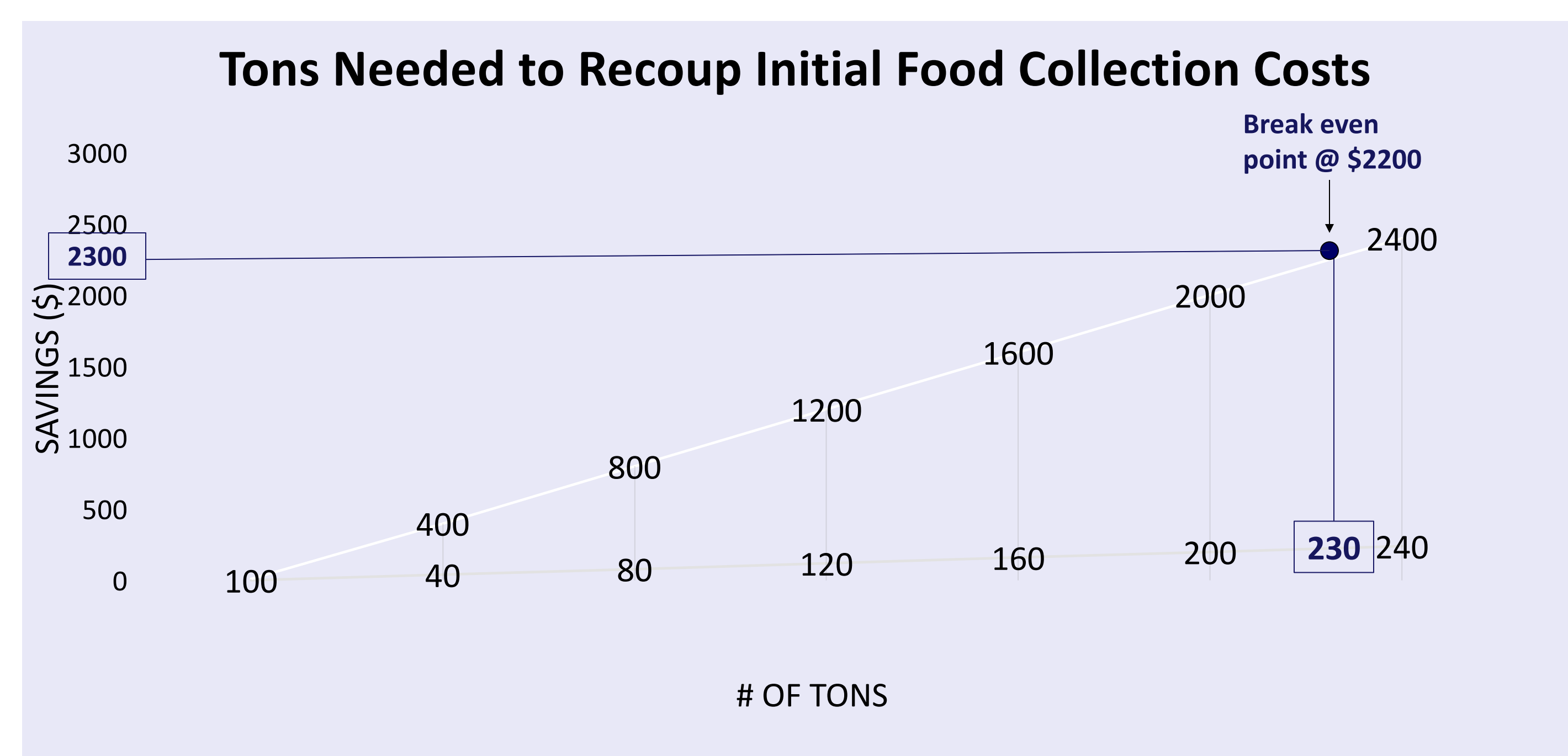


Figure 3. Initial investment for food separation can be offset with tipping fee savings. An average Pittsburgh restaurant can recoup this cost in 7 months.

Collection Scenario #1	Collection Scenario #2
20% collection of all industrial food waste	All industrial food waste from producers >104 tons/year
37,400 tons	171,960 tons

Figure 4. Pittsburgh would benefit from the collection of all food waste from the biggest producers rather than a percentage of total food waste.

Policy Recommendations

Point in Supply Chain	Policy	Based on
Production	Organic waste food ban	CT, MA, RI, VT
	Waste diversion law	CA
Collection	Tax credits	PA Charitable Food
	Municipal collection	San Francisco & NYC
Transportation	Tipping fees	LA

Conclusion

- Cities should consider AD to use food waste and reduce GHG emissions.
- Food waste as an AD feedstock is financially feasible in Pittsburgh, PA.

Acknowledgments

Thank you to Dr. Tom Richard, Haley Stauffer, Lara Fowler, Chad Frischmann, Matt Arenas, Risa Lewis, Amanda Liebhardt, Laura Rodriguez, Sarah Schanwald and Project Drawdown for guiding me in research.

*In collaboration with Sarah Schanwald

References

Please see references by scanning QR code:

