



Loop Closing



On-site Composting of Food Waste

A distributed approach to help achieve zero-waste goals

MWCOG Recycling Committee Meeting on Compost
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Topics

Barriers to the current approach

On-site mechanized composting

Approaches

Scaling (diversion) potential

Financial numbers

Next Steps

QA



Barriers to Recycle Food Waste with Industrial Waste Facilities

Barriers to centralized composting and anaerobic digestion facilities (6% diversion rate)

- Expensive to buy 10-20 acres in the DC area
- Costly environmental compliance requirements
- Permitting and zoning restrictions
- Neighbor resistance to siting facilities nearby
- Socioeconomic injustice issues



Hauling costs and consequences

- Accounts for ~70% of an organization's cost of disposing of food waste
- Greenhouse gas emissions, air pollution, spills, roadway congestion and damage, noise, disrupting communities



Distributed Composting

- Use composting machines, on-site
- Install where trash cans once stood
- Food waste is already handled here



- No land costs
- No hauling costs
- Mitigates rats, spills, smells



Regenerating Our Soils Vision

(What to do with the finished compost)



Distributed Composting Scaling Vision in DC

One sofa sized
composter at one food
service provider per
block, would provide
the capacity to
compost **1.5 times**
the food waste
generated in DC



Market/Scaling Numbers

\$11b – Annual cost to dispose of food waste in the US

\$67M – Annual cost to dispose of food waste in DC

2.5 year – Payback period to purchase enough composting machines for DC from the current annual cost to haul it to landfills/incinerators

\$166k – Annually available funds per staff to operate the systems at a 5 year payback period

200 – **Local jobs in DC** at an \$80k annual salary:
From harm to hire

How it Works

- Install in-vessel composting machines by replacing a portion of the dumpsters and trash cans used for landfilling material
- Compost food waste on-site in these machines: trained staff
- Bring the finished compost to our farms on food delivery vehicles that previously returned empty, regenerating the soil for better growing our next crops
- Repeat steps 2 and 3 - closing the ecological loop, implementing the circular economy
- Loop Closing provides this turnkey solution, inclusive underrepresented community members in the benefits

Possible Next Steps

- Life-cycle cost analysis comparison
- Level the playing field:
 - Account for hauling approach subsidies
- Pilot projects near you:
 - At grocery stores, restaurants, hotels, churches, offices, multi-units, food processors, government facilities, etc
- Policies and regulations to support this approach

Analogy for Increasing Capacity



Mainframe then Personal Computers



Centralized then Distributed Composting



Backup Slides



Photos

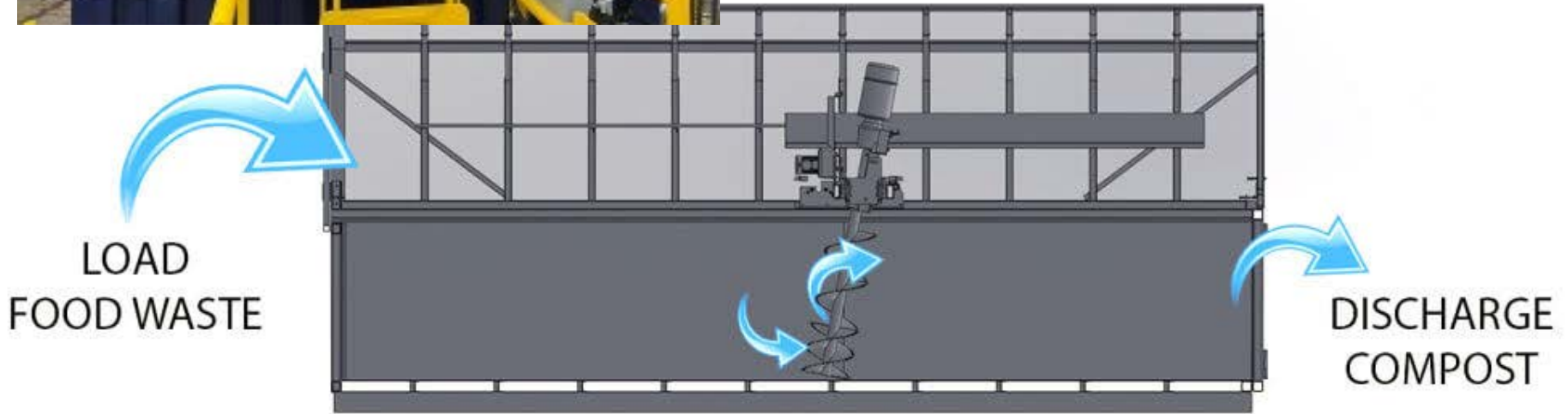




Photos



Photos





Photos

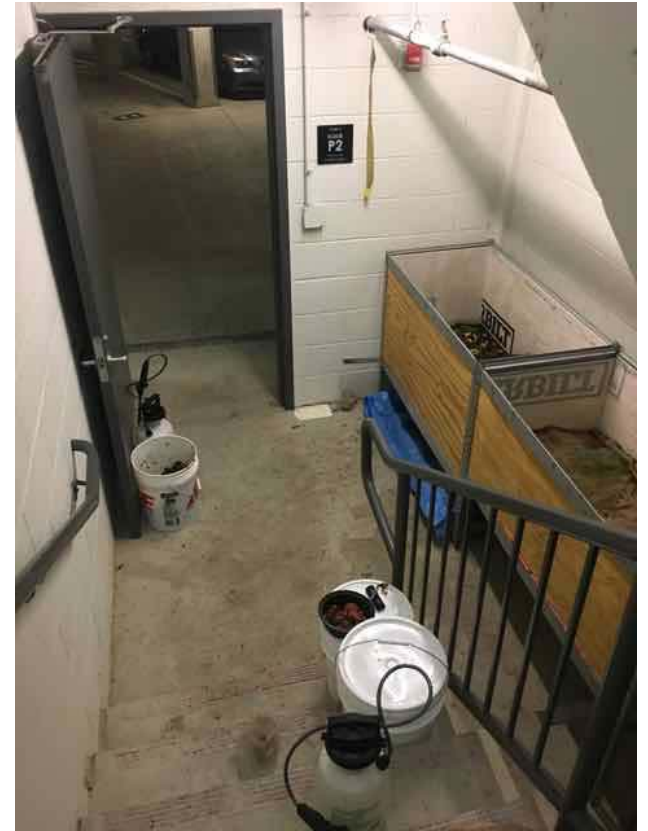


Photo courtesy of ILSR





Photos





Challenges to Recycling Food Waste

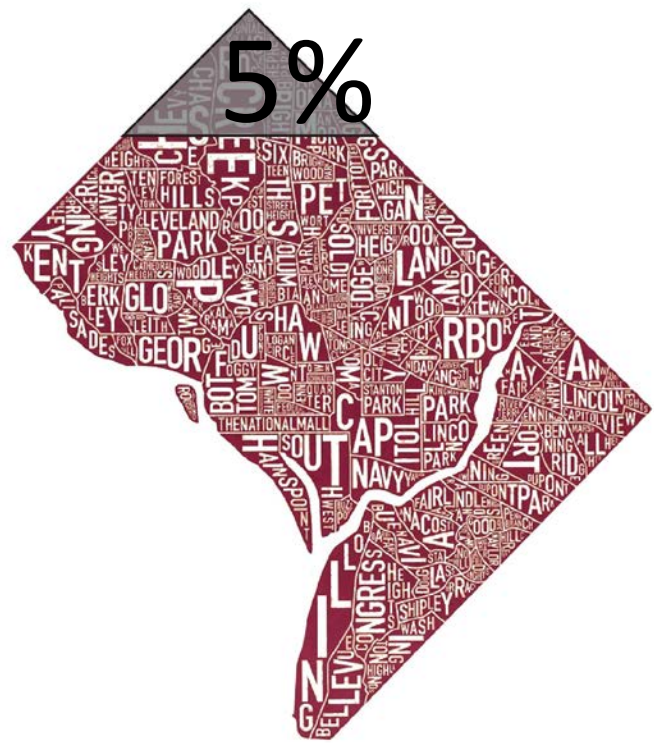
Food waste concentrates in urban areas

- 80.7% of the US population lives in urban areas, Census 2010

Lack of capacity to recycle food waste

- ReFED 2016 reports we recycle 5% of food waste

Need capacity in urban areas



Distributed Composting Scaling Vision in DC

Capacity for **1.5 x** the DC Market

- One 50-ton system on each of DC's ~5000 city blocks provides 250,000 tons of capacity annually
- DC 2016 Compost Feasibility Study estimates 166,000 tons of food waste generated annually
- Going small enables going big



Photo courtesy of Pluvr/Maxmillian van Praag

Business Model

- Plan, design, and install composting systems at food service organizations
- Operate and finance/lease the composting machines
- Monthly payments cover cost of unit, operating and maintenance costs, monitoring of process and quality of finished product, and handling the end product
- Payments for the finished compost provide additional profits

Progress

- On-site composting conducted in DC demonstrating small scale feasibility over the last 4 years at a Howard University dormitory, a 165-unit condo building, and DC Department of Parks and Recreation 56 sites
- Echoing Green 2018 Fellow
- Claneil Foundation sponsored pilot project in 2019 at a DC middle school kitchen, prove feasibility at a government site and workforce development training
- Interviews with 42 prospective clients, insights used to make iterations in the plan
- Interest expressed in additional local pilot project opportunities and DC government support building
- 1 in 3 farmers contacted is ready for finished compost beyond what we can could produce with the pilot projects

Implementation

Pilot Project Clients

- Target reputable organizations with a higher mission
- Pilot projects show feasibility for aligning government support

Scaling

- The reputable clients become the best marketers for scaling
- Align foundation and government support for seed funding/pilots and continued regulatory support
- Hire operations staff
- Build client base to be self-sustaining from revenue

Team

Core

Jeffrey Neal, PE, Commander United States Navy Retired, CEO

Lauren Burke, Development

Justin Smith, Data Systems

Advisors

- Mark Minukas, Management Consulting (McKinsey, CoCreate)
- Tom Kohn, Kogod School of Business, American University
- Brenda Platt, Co-Director, Institute for Local Self-Reliance
- Sarah Dachos, Deputy Director Farmers Veterans Coalition
- Jason Mathis, Founding Partner and VP for Oasis Marinas
- Christopher Bradshaw, Executive Director, Dreaming Out Loud

Competition

Landfilling – Subsidized. Continues status quo problems: land and hauling costs and environmental and community degradation

Bates, Waste Management, Republic

Food Waste Haulers – Subsidized. Continues industrial approach and status quo problems. Limited by centralized composting capacity, at 5% of need

Compost Cab, Compost Crew, Pluvr, Envirolations, Bates, DC Department of Public Works' proposed curbside pick-up

Community Composting – On-site, educational, and avoids the status quo problems. Not positioned to scale to provide meaningful diversion

Institute for Local Self-Reliance, DC Department of Parks and Recreation

Distributed Composting – Provides the missing capacity to scale, avoids the status quo problems, vertically integrated with the end user: farmers.

Needs capital for equipment and regulatory alignment

Loop Closing





Key Assumptions

- **Avoidance of hauling costs funds operations**

Food waste generators will pay for in-vessel composting out of their waste budgets, which includes hauling and tipping fees

- **Place systems where dumpsters go now**

- **Early adapters**

Focus on organizations with a higher mission as initial clients

- **See it (smell it) to believe it**

Prospective clients will need to visit a functioning operation to decide to try it at their sites

- **Farmers want the finished compost**

Food delivery vehicles will back-haul at scale

- **Continued government support**

DC government elected officials and staff support on-site composting of food waste will continue and apply to transporting finished compost

- **Replicable**

Works in nearly any region in the US (urban or rural) and world-wide



Revenue Model

- Land and hauling cost avoidance funds composting operations

Fund distributed composting from avoided hauling, tipping and land costs associated with the traditional haul/dump model for landfilling and food waste recycling at centralized facilities

- Similar cost range as status quo

Per ton capital and operating costs of distributed composting systems range between 60% to 200% of the cost of landfilling or centralized composting, before realizing economies of scale opportunities

- End users pay for finished compost

Leverage niche markets like home gardeners, high margin cannabis growers and then farmers as available quantities grow to meet their higher volume needs