Urban RePeel: Solutions for Metropolitan Food Waste

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Mission statement: To address urban food waste in a sustainable way, we look to use engineering principles to optimize vermicomposting techniques while minimizing environmental impact.

The Urban Food Dilemma

Food Waste

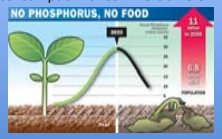
13% of all solid waste consists of food scraps and edible cast-offs from residences and the food service industry

25% of freshwater and **4% of oil** in America go to producing **food that will never be eaten**

America spends **$1 billion** annually to landfill food waste

Chemical Fertilizers

Earth's phosphorus stores will be depleted in **75 years** at the current rate of consumption for commercial fertilizers



2% of the entire world's energy production goes to producing fertilizers

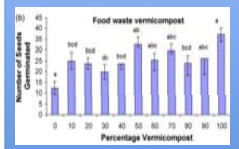
PROBLEM

SOLUTION

Vermicompost: Let the Worms Do the Work

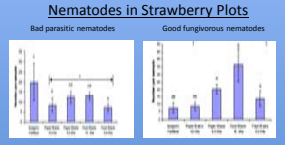
Red wigglers (*Eisenia foetida)* can eat up to their weight in food waste per day. Their excrements, or worm "casts," are a nutrient-rich soil additive. They can live in highly dense populations and don't burrow, making product separation easy.

Petunia Seed Germination



Norman Q. Arancon, N. Q.; Edwards, C. A.; Babenko, A; Cannon, J.; Galvis, P.; Metzger, J.D. Applied Soil Ecology **2008**, 39, 91-99.

Nematodes in Strawberry Plots



Norman Q. Arancon, N.Q.; Galvis, P.; Edwards, C.; and Yardim, E.. *Pedobiologia* **2003**, 47, 736-740.

Vermicompost Composition

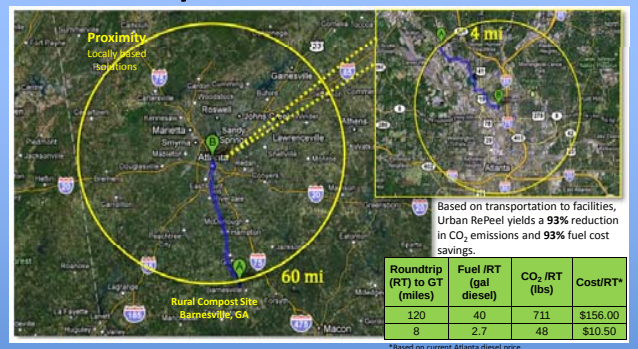
Parameters	Analysis as Received
Nitrogen	2.00%
Calcium	0.92%
Magnesium	0.24%
Potassium	1.40%
Phosphorus	0.70%
Iron	0.17%
Organic matter	33%
Moisture	50%
pH value	6.3

*Manufactured by Wormpost Vermont
**Tested by Midwest Labs, Omaha, NE

*Mary Appelhof, Worm Composting Resources

*Worm Wigwam

Why Urban RePeel?



Based on transportation to facilities, Urban RePeel yields a **93%** reduction in CO_2 emissions and **93%** fuel cost savings.

Roundtrip (RT) to GT (miles)	Fuel /RT (gal diesel)	CO_2 /RT (lbs)	Cost/RT*
120	40	711	$156.00
8	2.7	48	$10.50

*Based on current Atlanta diesel price

Food waste **from the City**
Vermicomposting **in the City**
Food production **for the City**

Local economic impact
Move to urban based food production, supply local fertilizer and impact urban landscaping

Better than landfilling: reduces methane emissions, costs, and incineration
Bio-based packaging: recomposting, reuse, return

Economic Feasibility

- Feedstock (food waste) cost: **FREE**
- Worms: 1000 worm per pound of food waste with 95% worm recovery
- Warehouse: lease annually
- Product profit: sell vermicompost for $10-15 / 20 lb bag
- Truck cost: one time truck investment plus fuel and maintenance costs
- Clients: Hospital, school and corporate cafeterias, restaurants, mall food courts, apartment complexes
- Customers: Local farms, landscapers, home gardeners

Market

Target retailers includes Home Depot, an **Atlanta based company**, thus increasing the feasibility of selling our product while promoting local business.

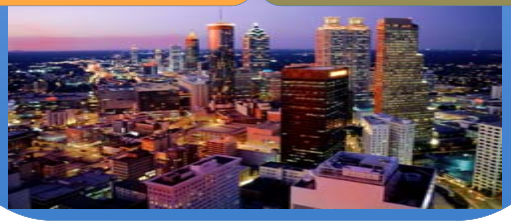
A variety of restaurants, apartment complexes, corporate cafeterias, and markets have expressed a willingness to participate in the Urban RePeel program

Location

Industrial warehouse space in Atlanta is readily available at approximately **$2.75/ ft²** annually (West Midtown)

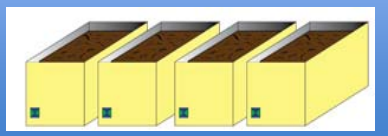
Equipment

The Worm Wigwam© is a commercially available, industrial scale vermicomposting bin with the capacity of composting **600 pounds of organics per day**



Future Expansion

- Expand waste collection to include waste oil and other organics
- Convert waste oil to biodiesel to utilize for truck fuel, further reducing energy costs & CO_2 emissions
- Increase target client base to include more residential centers
- Extend the Urban RePeel model to other major urban centers
- Build a series of experimental batch reactors for vermicomposting optimization



Series of reactors with varied temperatures and soil pHs to experimentally optimize the process